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ICE

A HANDBOOK

OF THE

THEORY AND PRACTICE OF MEDICINE.

BY

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TO

SIR WILLIAM JENNER, BART.,

K.C.B., D.C.L., M.D., F.R.S.,

THIS VOLUME IS DEDICATED

AS A

TOKEN OF ESTEEM AND ADMIRATION, AND IN GRATEFUL
REMEMBRANCE OF MANY ACTS OF KINDNESS,

BY

THE AUTHOR.

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THEORY AND PRACTICE OF MEDICINE.

SECTION I.

CHAPTER I.

INTRODUCTION.—OBJECTS AND METHODS OF STUDY.

In order to acquire a satisfactory knowledge of the Science and Art of Medicine, it is essential that the mind should have been previously cultivated and trained, and at the same time stored with the requisite information, by a careful study of the fundamental and more scientific subjects which form the earlier part of the medical curriculum. Above all is it necessary that the student should be thoroughly acquainted with the construction of the human body, and the normal composition, structure, and functions of its various fluids, tissues, and organs in health; in other words, with Anatomy and Physiology. Having this information, he will be very materially aided in his further progress, if, in the first place, he understands definitely what "Medicine" includes, and what he has got to learn; and secondly, if he sets about acquiring the requisite knowledge and skill according to a systematic, orderly, and scientific method.

The subjects which the study of medicine comprehends, may be indicated by giving brief definitions of the more general scientific terms which are employed in connection with it, and pointing out what is included under each.

I. DISEASE.—This term comprises every deviation from the natural condition of the body, or any porttion of it, either as regards its structure, state of nutrition, or the due performance of its functions. It will be readily understood that there is no absolute line of demarcation between *health* and *disease*, both being merely relative terms. If a disease is associated with any evident structural change, it is said to be *organic;* if no such change can be detected by any methods with which we are at present acquainted, it is called *functional.*

II. PATHOLOGY signifies that branch of medicine which deals with and explains the origin and causes, clinical history, and nature of the different morbid conditions. It is divided into:—*a. General pathology*, which treats of what is common to, or bears upon all or a number of diseases; and which comprehends certain very important subjects, such as congestion, hæmorrhage, inflammation, degenerations, &c. *b. Special pathology,* which has to do with the various special and individual diseases. According to the definition of pathology given above, it will be seen that it includes the two following.

III. Etiology or the Causation of Disease, which treats of the causes of the various maladies, or the influences and agencies by which they are originated.

IV. Symptomatology or Semeiology. These terms comprehend the science which is concerned with whatever pertains to morbid conditions, whether general or local, in their *clinical* relations, *i.e.* as they are represented in the living subject. It has to do therefore with :—*a.* Their *clinical history*, including *mode of onset* or *invasion ; symptoms* or *clinical phenomena ; course, duration*, and *modes of termination ; varieties* and *types ; complications* and *sequelæ*. *b.* Their *diagnosis*, which means the recognition of their seat and nature, and their discrimination from other morbid states. *c.* Their *prognosis*, or the judgment which is formed as to their future course and ultimate issue.

V. Treatment or Therapeutics.—It is only necessary just to mention these here, without any definition, their meaning being sufficiently obvious.

VI. Morbid or Pathological Anatomy and Histology.—The various structural changes which are associated with disease come under this head, as revealed by *post-mortem* examination.

I proceed now to point out the methods according to which medicine needs to be studied. First, a knowledge of its *theory* should be acquired, as taught in books, lectures, &c., in which such information and explanations are given with reference to principles and facts as can be conveyed in these various ways. Secondly, the *practice* of medicine must be learnt :—(i.) By personal observation and examination of actual cases of the several diseases, as exemplified in individual patients. (ii.) By proper attention to the different modes of *clinical instruction*, in connection with which must be mentioned the great advantages to be derived from a thorough training in "case-taking," under competent supervision. (iii.) By the education of those external senses which are being so constantly brought into use in the investigation of diseased conditions, and by repeated practice in the employment of the different instruments which are available for a similar purpose. (iv.) By the observation and study of morbid changes produced in the organs and tissues, as disclosed by *post-mortem* examination, the more minute alterations being ascertained by chemical and microscopic research.

All the methods of study just mentioned are important, though of course those of a practical kind are by far the more so, for anyone who relies on a mere theoretical knowledge of medicine is absolutely incompetent to enter upon its practice. Still this theoretical knowledge is not to be despised, for it helps materially to clear the way for practical study, saves a great waste of time and labour, and enables the student to comprehend far better what be observes, if he has mastered at least the elements of the subject, and the more information he possesses before beginning ractical work, the more likely is he to derive full benefit there- . Before proceeding to study particular diseases, it is very desir- to become well acquainted with the main facts pertaining to : subjects which come under *general pathology*. Then it is es- al that every branch of medicine should receive due attention, hat the pathological and clinical relations of different organs systems to each other should be known. It is a great mistake he student to confine his observation to any one or more "spe- ies," even though he may intend ultimately only to practise ; at the same time there are some of the more special depart- s which at the present day deserve particular attention.

ie usual fields for the study of illustrative cases of the several ises are the wards of a hospital, and the different out-patient rtments; each has its advantages and should be duly attended, former affording illustrations of the acute or more serious nic affections, the latter of the more common ailments met in ordinary practice, and of the minor or more localised dis- rs not usually admitted into hospitals. If practicable, however, very desirable that patients should also be visited at their own es, so that they may be seen surrounded by those conditions ch form part of their experience in everyday life. There are ain diseases, too, a practical acquaintance with which is of the atest consequence, which generally can only be studied in this , viz. :—the majority of the *acute specific diseases*, which, with a exceptions, are not admitted into general hospitals, on account heir infectious nature, and the opportunity is afforded only to nall number of observing them in the special hospitals set apart these complaints. Though it is requisite, if possible, that ex- ples of *all* forms of disease should be seen, however rarely they y be met with, yet those which are the more common, and ich are likely to come frequently under notice in the course of ctice, should receive the chief attention, and of these the student not observe too many cases, so as to become familiar with all chief facts pertaining to them.

CHAPTER II.

ETIOLOGY OR CAUSATION OF DISEASE.

is is a subject of the utmost importance, and demands the most entive consideration, for an acquaintance with the Etiology of ease is of great value in several respects. It often gives ma- ial aid in diagnosis; it not uncommonly influences the prognosis nsiderably, the same morbid condition differing much in its gra- y according to its cause; in the majority of individual cases it es most useful indications as regards treatment; and, above all, it enables the practitioner to take measures to prevent the development or extension of many diseases, and thus to maintain the health of the general community.

A knowledge of Etiology implies not only a general knowledge of the causes which are capable of producing disease, but also a more particular acquaintance with the relation between special causes and special diseases, and, so far as this can be obtained, an intelligent comprehension of the manner in which the various influences produce their injurious effects.

It will be readily understood that the same cause may produce many and very different diseases, and *vice versa;* but with regard to the various classes of disorders, it will be found that each is brought about most commonly by a certain limited number of causes, which act more or less directly on the organ or part affected. This remark may be illustrated by the relation which exists between "taking cold" and lung-affections; between improper food or drink and derangements of the alimentary canal; or between excessive mental labour and brain diseases. Further, the particular causes which give rise to special affections of each organ are still more limited in their range. Some diseases can only be originated by one, definite, *specific* cause, and to such the term "specific" is applied.

Numerous terms have been employed to classify causes, often with much ambiguity of meaning. Only those which are practically useful will be alluded to here. The primary division generally made is into *proximate* and *remote.* The *proximate* cause is really the actual morbid condition of any organ or structure upon which the symptoms present depend, and it is synonymous with *pathological* cause. *Remote* causes are further divided into *predisposing and exciting,* some of the latter being named *determining.*

Predisposing causes include those influences which bring about a condition of the system generally, or of some organ or part, rendering it more prone to become the seat of disease. *Exciting* causes comprehend the immediate and direct agencies by which the different morbid changes are produced. The term *predisposition* is used to express the state favourable to the action of an exciting cause, and the individual in whom it exists is said to be *predisposed.* It is not to be supposed, however, that there is a distinct and definite limit between the two classes of causes above mentioned; what may only *predispose* at one time may *excite* at another, and especially is this true when several deleterious influences act together and for a long period. Further, a so-called "predisposing cause" may only render one organ more liable to be attacked than another, as is seen in the influence of age upon the seat of tubercle or cancer.

For the purpose of pointing out the more common causes of disease somewhat in detail, it will be most convenient to classify them into :—1. *Intrinsic,* or those depending upon the individual, in whom they are inherent or acquired. 2. *Extrinsic,* or those due to accidental, and chiefly external influences. So far as this is practicable, an endeavour will be made to point out which predispose to, and which excite disease.

1. INTRINSIC. *a. Age.*—A number of diseases are more prone to occur at certain periods of life than at others; while some tend to affect different organs at different ages, or even special tissues in the same organ. This may be explained often by the nutritive and functional activity of the system generally, or of certain organs, being much greater at one time of life than at another, and therefore the liability to either general or local disease is more marked. Changes of structure also, in the direction of decay, not unfrequently account for the predisposition due to age, as, for example, degeneration of the vessels in old age rendering them brittle, and thus leading to apoplexy. Young children and persons advanced in years are very subject to ailments of various kinds.

b. Sex.—Females are more prone to certain affections than males, and *vice versa,* while some are necessarily limited to one or other sex. This depends on the different conditions of certain organs in the two classes of persons, and the length of outlets (*e.g.*, the urethra); on the functions peculiar to each sex; on the dissimilarity in habits, occupation, &c.; on the difference in constitutional strength and vigour; or on certain peculiarities in the nervous system, women being much more sensitive and excitable, and therefore more liable to various nervous disorders. The proportion of deaths is greater among males than females.

c. General or Constitutional Condition. State of Health, &c.—A state of debility, whether congenital or acquired, predisposes to many diseases. Possibly the opposite condition of robustness and vigour may increase the liability to others. The condition of the blood has also much influence, plethoric or anæmic individuals being predisposed to many complaints. Previous diseases, especially of an acute nature, frequently predispose to or excite others, *e.g.*, the various fevers, hooping-cough, lung-affections, rheumatism, syphilis, &c. A neglected symptom, such as cough, may be productive of serious mischief. Habitual neglect in attending to certain natural functions, especially those connected with the alimentary canal, very commonly leads to injurious results. The existence of morbid structural changes in organs or tissues may readily induce or predispose to further lesions, or may give rise to diseased conditions in other parts. Thus a fatty or calcified state of the arteries renders them liable to be easily ruptured; cardiac diseases often excite lung-affections, and *vice versa;* or one disease of the lung or heart may lead to another. Other causes of disease which may be alluded to here are direct loss of blood; excessive or long-continued discharges; or the sudden suppression of an habitual discharge, of a chronic skin-disease, or of some local development of a constitutional disorder, such as gout.

d. Temperament.—Four principal temperaments are described, viz., the sanguineous, lymphatic, bilious, and nervous, and each is supposed to indicate a susceptibility to certain particular diseases, though the information on this matter is very contradictory. Speaking generally, the *sanguineous* temperament is believed to predispose to fevers of a sthenic type, active congestion or hæmorrhage, and acute inflammations; the *lymphatic* to passive congestions, dropsies, low inflammations, and certain constitutional affections: the *nervous* to various disorders of the nervous system; and the *bilious* to digestive and hepatic derangements.

e. Idiosyncrasy.—Some individuals are affected injuriously by certain things, which do not at all influence others in the same way; this is the case with articles of diet, as fish, mushrooms, &c.; or medicines, such as iodide of potassium, quinine, &c. To this individual peculiarity the term "idiosyncrasy" is applied, and it probably has an influence in predisposing to some diseases.

f. Hereditary predisposition.—Several diseases are supposed to be capable of transmission from parent to offspring, and with regard to some of them this is unquestionably true, but the evidence is not so clear with respect to others. It must be borne in mind that members of different generations may be exposed to the same extrinsic causes of disease, and this may account for the fact that certain affections seem to run through families. Those maladies or general morbid conditions usually considered to be hereditary are:—

(i.) Certain constitutional or blood diseases, viz., gout, rheumatism, diabetes, scrofula, tuberculosis, cancer, syphilis.
(ii.) Some affections of the nervous system, viz., epilepsy, chorea, insanity, hypochondriasis, neuralgia, apoplexy, paralysis.
(iii.) Physical deformities, including deficiencies in connection with the special senses, such as blindness or deafness.
(iv.) Early degenerations, either local or general, which are evidenced by degeneration of the vessels, fatty changes in organs, loss of the elasticity of the skin, premature greyness or baldness, loss of teeth, &c.
(v.) Some skin diseases, especially psoriasis and lepra.
(vi.) Emphysema and asthma (?).
(vii.) Gravel and urinary calculus.
(viii.) Hæmorrhoids (?).

The conditions in different generations need not be identical, but may be merely related. This particularly applies to the nervous diseases above mentioned, and to the degenerations. For instance, there may be epilepsy in one generation and insanity in the next. Again, some vicious habit in the parent may lead to disease in the offspring, *e.g.*, intemperance may undoubtedly originate certain nervous disorders. In some cases a constitutional disease in the parent, such as syphilis, may only cause the child to be weakly and delicate.

The transmitted disease may be actually developed in the fœtus in utero, being then congenital; it may only appear at some period or other after birth; or it may lie dormant until brought out by an exciting cause. In some cases it is supposed to pass over one generation and to appear in the next, this being called "Atavism."

Hereditary tendency to disease is unquestionably intensified by intermarriage of those suffering from the same affection, *e.g.*, phthisis; also by the marriage of those who are closely related, very young, or of very unequal ages.

The hereditary character of diseases is sometimes shown in their development at an earlier age than is usual. This is the case with gout, and perhaps asthma. Families occasionally seem remarkably prone to be attacked by certain affections, and to have them with great severity, of which the infectious fevers afford illustrations.

g. Race.—There can be no doubt about the influence of race in increasing the liability to certain diseases or *vice versa.* This is exemplified in the greater proneness of white than black people to suffer from malarial fevers. The prevalence of some diseases, however, among particular races may be explained by their habits, mode of living, and place of abode.

2. EXTRINSIC. *a. Causes depending on surrounding meteorological and other conditions.*

(i.) *Atmosphere.*—The air we breathe must necessarily influence greatly the state of health, and it does so in the following ways. It may be impure, because it is not sufficiently changed by proper ventilation, and therefore contains an undue amount of the products of respiration, combustion, &c. Or it may be mixed with gases not usually present, such as those which emanate from sewers or decomposing animal or vegetable matters, or those which are given off in different manufactures. Suspended impurities are also often present, *e.g.*, dust, cotton, hair, wool, unconsumed carbon, fragments of metals, arsenic, and, probably, living organisms. The atmosphere is frequently the vehicle for the transmission of specific poisons. The degree of moisture of the air is highly important, excess or deficiency in this respect often producing very injurious consequences. Possibly its electrical condition, or the amount of ozone in it, may have some influence. And, lastly, the degree of pressure of the atmosphere certainly affects the health, of which we have a familiar illustration in the results which sometimes follow the ascent of a high mountain. Atmospheric influences may act either as predisposing or exciting causes.

(ii.) *Temperature.*—Excessive or long-continued heat or cold, whether acting upon the general system, or applied locally, is most injurious. A sudden change from one extreme to the other often causes serious mischief, and so does exposure to cold winds. Even in warm weather a "chill" may give rise to disease, and this is frequently due to the patient's own neglect, for instance, not being careful to change wet clothes, or being exposed to a draught when heated and perspiring.

(iii.) *Amount of light and insolation.*—Those who reside or spend the greater part of their time where little or no sun-light enters, are unquestionably below par as regards health. The amount and kind of artificial light employed has also some influence in the causation of disease.

(iv.) *Soil.*—The chief modes in which the soil exercises its influence are by the amount of vegetable matter which it contains susceptible of decomposition; by its degree of, and permeability to moisture; by its effect on the heat and light of the sun, whether absorptive or reflective; and by its chemical composition, which affects the composition of the water and air in the neighbourhood. Wherever there is an accumulation of vegetable substances, with sufficient moisture and a certain temperature, as is the case in marshy districts, malarial affections are almost always prevalent. Clayey soils are very moist and cold. Most sandy and gravelly soils are healthy, unless they contain vegetable matter. Those containing much lime and magnesia are believed to lead to goitre and renal calculus. The breaking up of soil is often attended with evil consequences.

(v.) *Sewage.*—This is a very common source of disease, both on account of the deleterious gases given off from it, and the decomposing organic matter of which it consists. In certain cases it contains specific agents in the production of disease, and promotes their development or renders them more virulent. Sewage materials or the gases which emanate from them are particularly hurtful in consequence of being mixed with the water which is used for drinking purposes.

b. Causes due to the social condition and habits of the individual, and certain other accidental influences.

(i.) *Food.*—This may be deficient in quantity or of improper quality, either habitually or only temporarily, and may thus promote or induce disease, especially in children. On the other hand it may be excessive or too rich in quality. Irregularity as regards meals, and the habit of bolting food, or insufficient mastication from any cause, are often very injurious.

(ii.)*Drink.*—Intemperance in the use of *alcoholic stimulants* is a fertile source of disease, and it is always well to bear this in mind when investigating any doubtful case. Spirits do most harm, especially if taken at frequent intervals, strong or only slightly diluted, and on an empty stomach. It must be borne in mind also that many of the compounds sold as beer, spirits, &c., contain most noxious adulterations. Water or the want of it is a very prolific source of disease. When insufficiently supplied for purposes of cleanliness, &c., serious results often ensue. The habit of drinking large quantities of water, especially during meals, frequently does harm. Again, water may be the direct means of conveying various morbific agents into the system, such as noxious gases, certain salts, poisonous metals, the ova of worms, animal organic matters, especially those contained in the excretions, vegetable matters in a state of decomposition, and specific poisons. Tea-drinking in excess very often causes ill-health, and its injurious effects are seen daily in all classes of society. Milk does harm if decomposed or adulterated, and it has been proved to be not unfrequently the medium by which specific poisons enter the system.

(iii.) Other *habits*, such as smoking or snuff-taking in excess; the use of narcotics, as opium, &c; or excessive indulgence in hot condiments, are not uncommonly injurious.

(iv.) *Clothing.*—This may be insufficient, either habitually or only from time to time, or certain regions may be inadequately pro-

Special causes of disease.—There are certain agents which excite disease not yet considered, and which require separate notice. They are chiefly of the nature of poisons of various kinds, and produce effects which are more or less definite and constant.

1. *Chemical poisonous substances, chiefly inorganic.* The effects of various chemical poisons upon the system are sufficiently obvious, and require no comment. It is necessary, however, to call special attention to the fact, that some of these may gain an entrance into the system in connection with the occupation or in some other way, and without being directly administered as poisons or medicines. This is seen in the deleterious effects, local or general, which are produced by lead, mercury, phosphorus, arsenic, copper, gold, and other substances. With respect to arsenic, it is important to observe that one of its compounds may be given off as a fine powder from certain green papers used for papering rooms, and be afterwards inhaled along with the atmosphere in which it floats, thus giving rise to symptoms of poisoning.

2. *Causes originating in the vegetable kingdom.*—(i.) Many of the ordinary poisons are derived from this source, such as opium. (ii.) *Parasitic plants* growing in various structures of the body are frequent causes of disease, especially of skin-affections. The presence of certain fungi in the stomach is supposed occasionally to give rise to vomiting. (iii.) *Decomposing vegetable matter* often does much harm. It is particularly injurious by producing *malarial or miasmatic poisons* so prevalent in marshy districts. These give rise mainly to certain peculiar fevers, ague, remittent fever, &c., but also to some nervous disorders and other complaints. This subject will be discussed in detail in a later portion of this work. (iv.) It is believed by many that *contagion* is due to low vegetable organisms.

3. *Causes originating in the animal kingdom.*—(i.) Certain animals are venomous and can inflict poisoned wounds, *e.g.*, serpents. (ii.) Some animals are poisonous if taken internally, such as cantharides. (iii.) *Parasites* derived from the animal kingdom very commonly set up morbid conditions. The various intestinal worms, and the external parasites which infest the skin afford illustrations. (iv.) *Specific contagious poisons.*—These will call for special and detailed consideration hereafter. A number of very important diseases originate from the entrance into the system of certain specific poisons, which are transmitted from some other animal to man, or from one human being to another, *e.g.* hydrophobia, small-pox, scarlatina, syphilis, &c.

4. *Causes originating within the system.*—Some morbid conditions are due to the presence of a poison in the blood, which has been generated within the body, as the result of the perversion of the functions of digestion, assimilation, and nutrition. Gout furnishes an illustration, and once developed the malady may be hereditarily transmitted.

CHAPTER III.

SYMPTOMATOLOGY OR SEMEIOLOGY.

A "SYMPTOM" may be defined to be anything which in the living subject gives evidence of the existence of some diseased condition. It is necessary to explain certain terms which are applied to symptoms. 1. *General or constitutional* and *local.*—These imply that the symptoms are referred to the entire system or only to some particular part. 2. *Objective* and *Subjective.*—The former include all symptoms which are evident to the senses of the observer, *e.g.*, redness or swelling; the latter those which are only felt by the patient, *e.g.*, pain, numbness, &c. 3. *Direct* or *Idiopathic* and *Indirect.*—These terms signify respectively, symptoms which are immediately associated with the diseased part; and those connected with some part remote from the seat of mischief, the latter in some cases being called *sympathetic.* Thus vomiting is often present as a "sympathetic symptom" during the passage of a renal calculus. 4. *Premonitory* or *Precursory.*—Before the actual development of a disease, symptoms may be present indicating more or less clearly what is going to happen, and to these the above terms are applied. 5. *Diagnostic, Prognostic,* and *Therapeutic.*—These words sufficiently imply that they mean those symptoms which indicate the nature of a disease, its prognosis, or its treatment. *Pathognomonic* is the term applied to such symptoms as belong to one particular disease and no other, which are therefore absolutely characteristic of it. Much confusion has arisen in the use of the word *sign.* Frequently it is employed as synonymous with *symptom,* but this is incorrect, for a *sign* really means a symptom which points to the nature of a disease; in short, it is a *diagnostic* or *pathognomonic symptom.*

Physical signs strictly speaking include all *objective symptoms,* though only such of these as are elicited by certain methods of *physical examination* are recognized by some as *physical signs.*

In the majority of cases a number of symptoms are grouped together, general and local, subjective and objective, but sometimes one becomes so prominent as to be popularly looked upon as the disease itself, and gives the main indication for treatment, *e.g.*, dropsy or hæmorrhage. Under such circumstances, however, it is imperative that the actual cause of the condition present should be carefully sought for, and the nature of the symptoms often gives a useful hint as to the direction in which this enquiry should be made.

It is very desirable that a knowledge should be acquired of the *clinical phenomena* which pertain to each organ or system, before the study of its individual diseases is entered upon. In the subsequent chapters, therefore, the description of the diseases of the several organs will be preceded by an outline of the symptoms and signs which have to be looked for as evidences of their being in a morbid condition.

MODE OF INVASION OR ONSET, COURSE, and DURATION OF A DISEASE. The meaning of these terms is sufficiently obvious. The varieties which are met with in these particulars are as follows: 1. The invasion may be quite *sudden*, as in the case of apoplexy, syncope, many hæmorrhages, &c., the subsequent course necessarily differing in different instances, a rapidly fatal termination being not uncommon. 2. Frequently the illness is *acute*, coming on rapidly, though often preceded by premonitory symptoms; being severe in its character; and of brief duration. Many acute affections run a tolerably definite course ordinarily; for instance, the eruptive fevers or pneumonia; but irregularities are frequently observed, owing to a number of disturbing influences being at work, and in many diseases there are distinct *varieties*. When the onset is less rapid and the symptoms are less severe, the illness is said to be *sub-acute*. 3. The great majority of cases are *chronic*, the symptoms setting in gradually, not being severe, and the progress being slow and protracted. A chronic disease may, however, be the sequel of an acute attack, or such an attack is often the cause of a fatal termination in chronic cases. 4. Some diseases are characterised by *periodical* exacerbations, which come on at regular or irregular intervals, the patient being comparatively or even quite well in the meantime. Such complaints are chronic in their progress, but acute or sudden as regards the onset and intensity of the attacks, having a remittent or an intermittent course. Epilepsy, ague, and asthma will serve as illustrations.

VARIETIES. Many diseases are liable to present more or less evident deviations from their ordinary clinical course, and these in some instances are so distinct as to be termed *varieties*.

COMPLICATIONS and SEQUELÆ.—*Complications* include such morbid conditions as are liable to arise during the course of a particular disease, but which do not usually form part of its clinical history. They may be due to the same cause; or be the direct result of the primary affection; or arise as accidental and independent events. *Sequelæ* are those morbid states which are likely to be left behind, or to be developed subsequent to the apparent cure of various affections. These complications and sequelæ are particularly observed in connection with acute diseases, such as fevers. It is very necessary to be familiar with those which are liable to arise in the several disorders, in order to be prepared for them, and to take measures to prevent their occurrence.

TERMINATIONS.—In a clinical point of view a case may terminate in—I. *Complete recovery*, which is usually gradual, the patient passing through a period of convalescence of greater or less duration, but may be sudden or very rapid. 2. *Incomplete recovery*, either a condition of impaired general health remaining, or some organ or part being permanently altered in its structure and functions; in fact a more or less *chronic* state of disease remaining behind. 3. *Death.*—This event may take place suddenly, rapidly, or slowly. As a rule it is a complex process, the functions of all the chief vital organs being more or less involved; but often the signs of approaching dissolution are associated more especially either with the *heart, respiratory organs*, or *brain*. Death beginning at the heart is said to be by *syncope*, and it may be due either to a want of a proper supply of blood to the heart, (*anæmia*); or to a loss of contractile power in this organ, from mechanical interference with its action, structural changes in its walls, or disturbance in connection with its nerves, (*asthenia*). In some instances, such as starvation, these two modes of death are combined. Death commencing at the lungs is said to be by *suffocation* or *asphyxia*. This may depend upon the air inspired being unfit to aërate the blood, or, for various reasons, not entering the lungs in sufficient quantity (*apnœa*); or upon a stoppage of the flow of blood through these organs, as happens when a clot suddenly obstructs the pulmonary artery. Death beginning at the brain is said to be by *coma*, being characterised by a primary state of stupor or insensibility, which, however, is soon followed by interference with the respiratory functions. These various modes of death are merely mentioned at present, as the symptoms which indicate their approach will demand a full description when treating of the diseases of the several organs.

ON THE METHOD AND OBJECTS OF CLINICAL EXAMINATION.

It is extremely important that the practitioner of medicine should be thoroughly conversant with the mode of conducting the clinical examination of patients, and that he should be able to carry this out in an intelligent and systematic manner. In order to acquire this ability, the student should realize that he needs considerable training and practice in "case-taking," a mode of clinical instruction to which he ought to devote his earnest and diligent attention, taking notes of a variety of cases, and writing commentaries upon them. It is very desirable that some definite plan of procedure in the investigation should be adopted and impressed firmly upon the mind, so that it may be followed without effort on the part of the observer. The plans recommended by various writers differ only in minor details, and that of which I now propose to give an outline will answer every necessary purpose. I will endeavour to point out at the same time the object and meaning of the different enquiries which are made, as it is very important to have clear views on this matter.

1. Having noted down the patient's name, age, sex, race (if peculiar), whether married or single, and the date of admission into hospital or when first seen, enquiry should be made with regard to *residence, social position, occupation, habits* and *mode of living*, with special reference to *food* and *drink, clothing*, and *cleanliness*. Thus information is obtained as to the *general history*.

2. The *family history* should then be taken, in order to ascertain if any hereditary tendency to disease exists. It may be necessary not only to enquire about particular diseases, but also as to the habitual state of health, the ages when death occurred, and other

matters which an individual case might suggest. Of course it is of primary consequence to investigate with regard to parents, brothers and sisters, and children; but grand-parents and collateral relatives, such as uncles, aunts, and cousins, must not be neglected, should there be any reason to believe that there is some hereditary taint.

3. The *previous state of health* of the patient is next to be investigated, and the occurrence of particular diseases noted. Among those maladies which it is particularly necessary to keep in mind are the acute specific fevers, rheumatic fever, pulmonary affections, and syphilis in certain cases. It is always well to ascertain how the chief functions are habitually performed, especially those connected with the digestive organs, and, in females, the menstrual functions.

4. Coming then to the *present illness*, enquiry must be made as to whether it can be traced to any definite cause; and as to its *clinical history*, including its duration, so as to determine whether it is acute or chronic, in the former case it being requisite to ascertain as nearly as possible the exact date of its commencement; its mode of invasion; the chief symptoms complained of; and their progress up to the time at which the patient is seen.

It will be evident that the chief object of the investigation thus far, is to find out what causes have been influential in bringing about the morbid condition present, whether revealed in the *general history*, *family history*, *previous health*, or in the history of the origin of the *present illness*. No case ought to be looked upon as properly investigated, until every effort has been made to trace the mischief to its source, and, in order to arrive at a satisfactory conclusion on this matter, it will be obvious that it is essential to have as correct and concise a knowledge as possible of the ordinary causes which are likely to give rise to disease of each organ or system, as well as of the relation between particular causes and particular diseases. The degree of difficulty in making out the etiology of a case varies very considerably; in some instances it is evident at once, and one or more causes may be definitely and positively fixed upon; in others very careful and prolonged enquiry has to be made, and then, perhaps, without any substantial result. And here it must be remarked that much caution is often needed in accepting the statements of patients, and this applies especially to the account they give of their habits, family history, and previous illnesses. Many mislead from ignorance, but it must also not be forgotten that patients who indulge in vicious habits, such as abuse of alcoholic stimulants, or who have suffered from venereal diseases, not unfrequently try to conceal these facts.

Not only is the enquiry up to this point useful in determining the etiology of a case, but further, the information obtained is often of material aid in diagnosis.

5. The next and most important step is to take the *present state*, *i.e.* to submit the patient to a personal examination, and note the existing clinical phenomena. Here again it is necessary to impress upon students the extreme desirability of adopting a sys-

tematic course in conducting this examination. This not only materially facilitates the process of arriving at a diagnosis, but, not uncommonly, it is absolutely essential in order to come to a correct conclusion as to the seat and nature of a disease. When learning how to "take cases," it is desirable to go through a tolerably complete investigation of every organ and system of importance in the body, first noting down any *general* symptoms which may be complained of or observed.

The methods by which the required information is obtained are by *intelligent and orderly questioning* of the patient, or of friends or others who are in a position to render it, should the patient be mentally or physically unfit to be interrogated; and by *objective* or *physical examination*. The former reveals *subjective*, the latter *objective* symptoms or *physical signs*. The term *physical examination* is somewhat ambiguously employed; properly it is synonymous with *objective examination*, and should include all modes of investigation in which the external senses of the observer are brought into use; by some, however, it is confined to certain special methods, such as those adopted in the exploration of the chest or abdomen. In conducting them most important aid is derived from the employment of various instruments, such as the stethoscope, laryngoscope, ophthalmoscope, thermometer, microscope, &c., and from the use of chemical tests.

It will be at once evident that what is ascertained by *objective examination* is generally far more helpful to the practitioner, and can be much more implicitly relied upon, than what is gathered from the statements of patients or others, and therefore this method ought never to be neglected, if it can be brought to bear in any way upon the investigation of a case. With regard to the *subjective* sensations of patients, although, of course, they should always be taken into account and duly weighed, both for diagnosis and treatment, yet the description of them must be received with a certain degree of caution, otherwise very serious mistakes may be made. They are liable to be exaggerated or misrepresented, and it must not be forgotten also that symptoms may point to one part, when some other is actually the seat of mischief. There is one rule which should be invariably followed by the practitioner, viz:—to test the statements of patients, whenever this is practicable, by *personal* observation. so as to verify them or otherwise, and to see as much as possible for himself. This remark may be illustrated by such symptoms as spitting of blood, vomiting, local redness or swelling, about which patients frequently give very unreliable accounts. The special modes of *physical examination* demand most careful study, as, in a considerable proportion of cases, one or other of them constitutes the only means by which we can possibly arrive at a correct diagnosis. In order to carry them out satisfactorily, much *personal* practice is needed, during which the different external senses are trained and educated, and the use of the various instruments is learnt, while at the same time a knowledge is acquired of the nature and meaning of the *physical signs* which are observed or elicited. It must be remarked that in subjecting patients to *physi-*

cal examination, regard must always be paid to their condition, for they may be too exhausted or otherwise incapacitated for undergoing it, and might therefore be seriously injured if proper care were not exercised.

6. Having thus concluded the clinical examination of a case, and methodically recorded the facts elicited, the student should then *write a commentary* upon it, summing up its leading etiological and clinical features, and giving his views as to its diagnosis, pathology, prognosis, and appropriate treatment. In this way the mind is trained for going through that process of reasoning which is always supposed to be performed when an opinion is being formed on these matters, but which too often receives very inadequate attention, or is even ignored altogether.

7. If possible, it is very useful to watch the case in its further *course* up to its *termination*, noting the progress of the symptoms, as well as any new phenomena which may arise, including *complications* and *sequelæ*. Should the termination be fatal, the *post-mortem examination* ought to be conducted in the same systematic manner as that during life, a record being kept of the condition of the various organs and structures.

Of course it is not to be expected that those engaged in ordinary practice can submit every patient to the complete routine examination just described, nor, indeed, is this required in the majority of cases; much of the general and family history will be known in many instances, and an experienced observer can usually obtain a speedy clue as to the probable seat of disease, and can frame and direct his enquiries accordingly. At the same time every practitioner ought to be thoroughly competent to carry out a full and searching investigation, should this be needed, while it is very important to avoid falling into the habit of conducting it in a careless and superficial manner, and every case should receive as attentive a consideration as its nature seems to demand.

A few concluding hints as to the mode of examining patients when rapidity of diagnosis is desirable, may be of assistance to young practitioners, as well as to advanced students, especially those who may have to undergo examinations in clinical medicine.

1. Whenever a patient is first seen, the observer should always be looking out for anything which may be evident on a superficial and cursory examination. Much information is often thus gained, and important clinical phenomena may be at once noticed, which give most useful indications as to the seat or nature of the existing disease. The chief matters to which attention is to be directed are as follows:—*a*. The *general aspect* and *condition*. This may reveal, for example, the "typhoid state"; corpulence or emaciation; malnutrition of the muscles; a peculiar temperament; agedness; or striking evidences of some constitutional disease, *e.g.*, cancer or scrofula. *b*. The *posture* or *gait*, which may indicate great debility or helplessness; prostration; difficulty in breathing; restlessness; or immobility on account of pain, paralysis, &c. *c*. The *countenance*. This deserves careful study, for it often affords most instructive information. Thus we may observe an *abnormal colour*, such as

which is found to be primarily affected. After this a few questions may be asked, so as to find out the state of the chief systems in the body, even though no symptoms are complained of having any reference to them. Especially is it useful to pay attention to the digestive, respiratory, and circulatory organs, and, in females to find out whether menstruation is normal. It is a good rule always to look at the tongue; to feel the pulse; to submit the lungs, heart, and vessels at least to a cursory examination; and to *test the urine*, particularly if there is any obscurity about the case under investigation.

The discovery of the seat and nature of the malady from which a patient is suffering often affords most valuable suggestions as to the points to be principally attended to in the history, in order to ascertain the etiological facts bearing upon the case. In this way not only may the diagnosis be rendered more certain and clear, but most useful indications for treatment are frequently brought to light.

CHAPTER IV.

GENERAL REMARKS ON DIAGNOSIS, PROGNOSIS, AND TREATMENT.

DIAGNOSIS. It cannot be too often insisted upon, that to endeavour to arrive at a *satisfactory diagnosis* ought to be the first duty of a medical practitioner in every case which is brought under his observation and treatment. Now it is very necessary for those who are studying medicine to understand at the outset what a *satisfactory* diagnosis means. It implies a complete, exact, and comprehensive knowledge of the case under consideration, as regards the seat, extent, and nature of *all* existing morbid conditions. Of course such a diagnosis is not always attainable, but it is what should be conscientiously aimed at, and, if the observer has acquired the knowledge indicated in the previous chapters, and conducts his investigation with sufficient care and thoroughness, a tolerably correct opinion can generally be formed. It is not an uncommon error to be content with merely ascertaining the chief symptoms present, perhaps giving a name to the group, such as dyspepsia; or to fix upon one prominent symptom, *e.g.* ascites or jaundice, and call that *the disease*, while no attempt is made to interpret the meaning of the phenomena which are observed, or to find out the pathological conditions upon which they depend. Again, when one or other of the organs is found to be structurally diseased, it often happens that very inadequate attention is paid to the determination of the precise locality, extent, and nature of the existing lesions, while the possibility of other organs being implicated is very liable to be overlooked, and thus the diagnosis is by no means so thorough and exact as it ought to be.

In attempting to form a diagnosis, a process of mental reasoning should be gone through, which needs to be more or less elaborate in different cases, the facts elicited being passed in review, and certain conclusions founded upon them. The questions to be decided may be thus stated:—

1. Whether there is anything wrong at all, for it must be borne in mind that not a few complain when there is no actual disease, especially among those who belong to the class of malingerers. 2. Should there be indications that the patient is really ill, it is requisite to determine:—*a*. Whether the ailment is *acute* or *chronic*? *b*. Does it belong to the class of *general* diseases, and, if so, what is its nature? *c*. Is the mischief localised in one or more of the organs of the body, or in some particular tissue? *d*. Should this be the case, is there merely functional disorder, or can any positive organic and structural change be detected? The seat, extent, and nature of all morbid alterations should then be made out as accurately as possible. It must not be forgotten that *local* lesions are frequently found accompanying the so-called *general* diseases, such as the various fevers, and a diagnosis would be anything but complete in such affections, unless every care had been taken to ascertain whether any local mischief existed.

The exact mode of arriving at a diagnosis differs in different cases, while the degree of difficulty experienced in coming to a correct conclusion is necessarily very variable. In some instances we can make a *direct* diagnosis speedily and confidently, some combination of clinical phenomena, or some one or more *pathognomonic* symptoms being presented, which at once reveal the nature of the malady. In others the diagnosis has to be more or less *differential*; diseases which resemble each other being called up in the mind, and discriminated from each other. This is a less simple and easy process, and a very careful consideration of all the elements which are available for assisting at forming a diagnosis is often required. These elements, when the patient is first seen, are:—1. The account which is given of the *general history*, *family history*, and *previous health*. 2. The history of the *present illness*, as to its duration, probable cause, mode of invasion, and progress. 3. The actual clinical phenomena observed, especially those of an *objective* character. Even after the fullest consideration of all these points, it is sometimes impossible to come to any, or to more than a very doubtful conclusion. Under these circumstances it is exceedingly important not to form a hasty opinion, but to learn to wait and see what assistance the course of events may afford. This rule is especially to be attended to in cases of acute febrile diseases, otherwise very serious mistakes are liable to be made. The further elements in connection with the progress of a case which may aid diagnosis, are:—4. Its clinical course, duration, and termination. 5. The phenomena observed on repeated examination under various conditions. 6. The results of treatment. In some obscure cases a diagnosis can only be made by *exclusion*, *i.e.* by proving the absence of all diseases which might give rise to the symptoms observed, except one, the presence of which is therefore rather a matter of probability, than actually indicated by any positive signs. Occasionally it is quite impossible to come to any conclusion as to the nature of the malady from which a patient may be suffering.

In order to render the process of arriving at a diagnosis more easy and rapid, as well as to ensure greater certainty in the opinion formed, the following points are worthy of the attention of students. They should make themselves familiar with the *more characteristic* clinical signs of, at least, the *ordinary* individual diseases, *i.e.* those symptoms which are diagnostic or pathognomonic. Then it is very useful to be able, speedily and without difficulty, to call up in the memory the complaints which have to be discriminated from each other, in any case which comes under notice. Therefore it is necessary to bear in mind what affections resemble each other; to have the chief diseases of the several organs arranged under the two groups of acute and chronic; and to be well acquainted with the pathological causes to which any very prominent symptom may be due, such as dropsy, jaundice, &c. Lastly, in making a diagnosis it must not be forgotten that irregularities and deviations from the usual clinical course of diseases are often met with in practice; that many affections present distinct and well-marked *varieties*; and that some serious complaints are liable to arise very insidiously, not being attended with any prominent clinical phenomena.

PROGNOSIS. To "give a prognosis" is often a matter of considerable difficulty, and in many cases it involves an amount of knowledge and tact, which can only bc acquired by prolonged experience. Here it is only practicable to give a few general hints bearing upon the subject. In the first place it is requisite to understand what questions have to be determined in forming a prognosis, and to try to realize distinctly which of these apply more particularly to any individual case, before offering an opinion concerning it. These questions have reference to the progress, ultimate issue, and duration of the case, and the following include the most important:—1. Whether the disease is more or less likely or certain to terminate in death or recovery; or to continue for an indefinite period as a permanent and incurable malady, but without causing any danger to life? 2. In case of death, may this event be expected to take place suddenly or slowly, and in what way will it probably be brought about? 3. If the patient recovers, will the cure be complete, or is there a danger of some morbid condition being left behind, either a state of general ill-health or some local organic lesion remaining? 4. What will be the probable duration of the complaint? 5. What events are liable to happen in its course, such as changes in symptoms, development of new symptoms, critical phenomena, the occurrence of complications, &c.? 6. Does its presence render the patient more amenable to other affections; or, on the other hand, does it afford protection against certain maladies? 7. May not slight symptoms observed be but signs and warnings of some more serious mischief which is likely to happen? For example, numbness, tingling, slight local para-distinctly what it is intended to accomplish by its aid, and what are the indications afforded as to the measures which are required.

It is requisite to make a few general remarks upon the *objects*, *indications*, and *methods* of treatment.

The *objects* which have to be kept in view in treatment may be stated as follows:—1. To *cure* the patient as speedily and completely as possible. This is termed *curative treatment*, but though it is a reality, it is applicable to only a limited number of diseases. 2. To *guide the progress* of a malady towards a favourable termination when this is not directly curable, but must run a certain course, the object being to *avert death* and prevent permanent injury to health. This is termed *expectant* treatment, and may be illustrated by the treatment of most fevers, and it is very important that it should be duly recognized, as a great deal of mischief is often done by meddlesome interference, and it is far better to let many diseases take their natural course, merely watching their progress and only adopting active measures when circumstances seem to require them. 3. To *prolong life*, and to make the condition of the patient as comfortable as possible, should a fatal termination be inevitable. 4. To remove or relieve *symptoms*. The result may be merely *palliative*, or sometimes in a sense *curative*. For instance, the removal of ascites and other forms of dropsy may practically cure a patient, in so far that he is able for many years to follow the ordinary avocations of life, although the organic disease upon which the dropsy depends is permanent. It is entirely wrong in principle merely to direct treatment to symptoms, or to attempt to relieve them at the expense of the general disease. At the same time they frequently need particular attention, and in some cases nothing further can be done than to endeavour to mitigate them. 5. To *prevent* diseases. *Preventive* or *prophylactic treatment* is of the deepest importance. It includes attention to the general health of an individual, so as to obviate any tendency to disease; the prevention of the extension of a disease in the same person or to other individuals, and the guarding against possible complications; the warding off of habitual attacks, such as those of acute dyspepsia, asthma, or epileptic fits; and the rooting out of various maladies, especially of constitutional disorders from the members of a family, and of contagious diseases from the midst of communities. In some instances all that can be done is to warn patients against doing things which may give rise to injurious consequences, and to ward off everything that might be hurtful.

The *indications* for treatment are derived from—1. The nature and seat of the disease. 2. The *causes* which have led to it. 3. The personal conditions and surrounding circumstances of the patient. 4. The *symptoms* present, which may not only call for the adoption of certain measures, but may *contra-indicate* a line of treatment which would otherwise be followed. 5. The state of the system generally and of the chief organs of the body. The condition of the lungs, heart, and kidneys, often influences treatment influence in treatment, such as the place of residence of the patient, with its surrounding conditions; habits of life; occupation; clothing; amount of exercise; change of air and climate, &c. It should be remembered that it is the duty of the practitioner to be prepared, if necessary, and especially in cases of acute febrile diseases, to attend personally to questions connected with diet and hygiene, and to see that his instructions are duly carried out. Thus it is often advisable to examine food, such as beef tea, and see that it is of the proper kind and properly made; also to look to the conditions of the sick-room, especially as to ventilation and cleanliness, temperature, the state of the bed, and the removal of excessive curtains or carpets. If a nurse is needed, he should see that she is competent and reliable, as upon this the ultimate issue of many cases turns.

3. *Local and external applications.* These are often most serviceable in treatment, such as hot fomentations or poultices, cold applications, baths, liniments, ointments, lotions, blisters, sinapisms, plasters, mechanical appliances, electricity and galvanism, gargles, &c. In this connection may also be mentioned the employment of friction, shampooing, and similar measures, which are sometimes very useful.

4. *Operations* are not uncommonly required even in medical practice, *e.g.* venesection or the local removal of blood, paracentesis, acupuncture, the use of the aspirateur, tracheotomy, &c. When either of these is clearly indicated, there ought to be no unnecessary delay or hesitation in having recourse to it.

SECTION II.

In the present section it is proposed to consider certain morbid conditions which are included under "general pathology," of which, as already stated, it is most desirable to have a comprehensive knowledge before studying them in connection with special organs or tissues.

CHAPTER I.

HYPERÆMIA OR CONGESTION.

By these terms is meant the presence of an excessive amount of blood in a part. According to its cause and to the vessels in which the accumulation chiefly occurs, the hyperæmia is said to be *active* or *arterial*; *mechanical* or *venous*; *passive* or *capillary*.

I. ACTIVE OR ARTERIAL—DETERMINATION OF BLOOD.—In this form the arteries are chiefly implicated, being dilated, while there is an increased afflux of blood through them, though usually too much blood passes out by the veins as well, and the circulation is accelerated.

SYMPTOMS AND EFFECTS.—The objective signs of *active congestion* are more or less bright redness, with turgescence and increased temperature. Pulsation in the arteries is increased and may be visible, while secretions are often more profuse or altered in quality. Ultimately the vessels may be so distended as to transude serum, or even to rupture and give rise to hæmorrhage. The subjective sensations are usually those of heat, fulness, and throbbing: the functions of a congested organ are often materially and seriously interfered with, as is seen in the case of the nerve centres or lungs, for example. If the congestion continues for a long period it may lead to permanent hypertrophy or induration of tissues; the arteries also may become persistently dilated and thickened.

CAUSES.—1. Paralysis of the muscular coat of the arteries is the usual cause of active congestion, in consequences of which they yield to the normal pressure of the blood. It is well known that this coat is under the control of nerve fibres which pass from the spinal cord through the sympathetic, and these exercise an important influence on certain pathological processes, of which active congestion is one. The paralysis may be produced.—(*a*) By direct injury to the spinal cord in experiments, or as the result of injury or disease. (*b*) By injury to the sympathetic trunk, of which the congestion resulting from the pressure of an aneurism upon the sympathetic in the neck is an example. (*c*) By reflex irritation through the sensory nerves, such as the congestion following the application of a mustard poultice, heat, or cold, or that ensuing upon the excessive use or increased activity of an organ, such as the eye or mammary gland. Under the same category may be mentioned that which often attends severe neuralgia. Probably many congestions of internal organs are produced in this way, and it is frequently the first step towards inflammation. *(d)* By causes acting through the brain, which may be illustrated by emotional blushing, and by the effects of some poisons.

2. The rapid withdrawal of external support from arteries may cause them to be dilated and thus lead to congestion. This is seen in the effects of applying a cupping-glass to the surface, by which the pressure of the atmosphere is removed.

3. The internal pressure on the vessels may be increased, either from an augmented force on the part of the heart, which principally affects the structures supplied by the arteries given off from the arch of the aorta; or from some channels being obliterated, the blood having therefore to find its way by those which are pervious, consequently distending them unduly. The best illustration of the latter is the "collateral circulation" which is speedily set up when a main artery is tied, or when it is suddenly blocked up in any way. Internal congestions are also often due to this cause, as when they follow exposure to cold, which leads to contraction of the small vessels of the skin, and thus the blood is, as it were, driven inwards. If the walls of the arteries are weakened from any cause, and are deficient in tone, they are more liable to become enlarged, but this does not appear sufficient in itself to determine active congestion.

II. MECHANICAL OR VENOUS.—Here there is no excess of blood entering a part, but a difficulty is experienced in its passage through the veins, which, therefore, as well as the capillaries, become overfilled with dark blood, moving slowlyand languidly. This is a very important form of congestion, and often leads to troublesome symptoms calling for the attention of the physician.

SYMPTOMS AND EFFECTS.—The objective signs, supposing the congestion to be superficial, are redness of a dull, dusky, purplish, or livid hue, with frequently evident distension of the capillaries and veins, the latter being often knotted; increase in bulk of the part affected; and not uncommonly a lowering of temperature. After a time the watery part of the blood transudes. containing some of the solid constituents in solution, and thus "dropsy" is produced, which gives rise to still greater enlargement, with a feeling of softness, and pitting on pressure. In some cases a fibrinous material is exuded, giving to the affected structures a firm and brawny feel, as may be observed after obstruction of the veins of the leg in phlegmasia dolens. When the kidneys are congested, albumen is often present in the urine; while, in connection with mucous surfaces, the same condition leads to a watery flux.

If the congestion is still more intense the colouring matter of the blood passes out, or the corpuscles migrate through the walls of the vessels into the surrounding tissues, or finally the vessels themselves give way and hæmorrhage occurs, as is observed in the case of varicose veins, and in the bleeding into the stomach or intestines which follows obstruction of the portal vein. This event is especially apt to happen if the vessels are weakened, and the bleeding may take place into the substance of organs, as well as on free surfaces.

Should the congestion be very great, rapidly produced, or long continued, it will lead to serious interference with nutrition,, which may end in ulceration or gangrene. Occasionally a "thrombus" is formed in connection with a congested vein, *e.g.* in the portal vein in cases of cirrhosis of the liver. With regard to organs or tissues, mechanical congestion in time causes them to become enlarged or thickened, while a fibroid material is produced, causing induration, stiffness, and loss of elastic and contractile properties. Changes in colour are also not uncommonly noticed, to grey, brown, black &c., due to alterations in the blood-pigments. Ultimately organs may become much contracted and diminished in size, being also seriously disorganized as regards their structure.

The subjective symptoms will necessarily vary according to the part affected. Generally there is a sense of weight, or dull heavy uneasiness, while the functions of the organ or structure involved are impaired to a greater or less degree. External parts which are the seat of venous congestion often feel cold and numb.

Causes.—1. Some *mechanical* interference with the circulation of the blood through the veins is the ordinary cause of this form of congestion. This may be seated in the heart, and thus affect the entire systemic or pulmonary circulation, or both, according to the precise locality of the impediment. It may only involve some special vein or system of veins, such as the portal, or those of a limb, the obstruction being localized. The cause of the impediment may be either something within the vessels, such as a thrombus constriction from morbid changes in their coats; or external pressure upon them as from a tumour, ligature, contracting lymph, &c.

2. Parts which are dependent are very prone to become congested from the mere influence of *gravitation*, and this is especially apt to occur if the tissues are relaxed and yielding, or the *vis a tergo* is deficient. Illustrations of this mode of origin are presented in the congestion of the veins of the legs which follows long standing; and in the formation of hæmorrhoids as the results of sedentary occupations.

3. A diminution in the *vis a tergo* often gives rise to this form of hyperæmia, or assists other agencies in its production. The heart may be weakened in its action, or the arteries have lost their elasticity and contractility, owing to degeneration, and thus the forces which carry on the circulation are impaired, so that the blood cannot be driven through the veins. This is especially observed in old people.

III. Passive or capillary.—Many include "passive" under mechanical congestions, but there is a distinction between them, though they are often associated. The capillaries are mainly involved, and the circulation is very languid in these vessels owing to a disturbance of the vital and nutritive relations between the elementary tissues and the blood. The conditions of a part thus congested are very similar to those observed in mechanical congestion. Atrophy of, and degenerative changes in the tissues are liable to occur, while they become prone to low and asthenic forms of inflammation, tending to assume a chronic character.

CAUSES.—1. A generally weak state of the system induces passive congestion, owing to the feeble activity of the circulation, and to the deficient nutrition and want of tone in the tissues. It especially affects parts which are dependent, or which are distant from the heart. Thus we see coldness and blueness of the extremities, nose, and ears under these circumstances. Also the hypostatic congestions, which are met with in various low fevers and debilitating diseases, come partly under this category.

2. Morbid conditions of the blood may cause passive hyperæmia. That which is present when the blood is improperly aerated is considered by some to be of this nature, and deficiency of fibrin also favours its occurrence.

3. If an organ or part is locally debilitated from any cause, and the functions of its tissues impaired, it is prone to become the seat of congestion. As illustrations of this may be mentioned the congestion which is observed often in paralysed limbs, and that which follows excessive functional activity of an organ, whereby it has become exhausted. It also may succeed active congestion or inflammation, owing to the preverted relations thus set up between the blood and the tissues, as is frequently observed after tonsillitis.

POST-MORTEM APPEARANCES.—Redness, varying in its tint and form according to its nature, is the essential character of all forms of congestion, In *active* congestion the colour is bright red, and is usually in the form of a minute network, or it may appear uniform or in points when certain special structures are involved. It must be borne in mind, however, that there may have been active hyperæmia, and yet no redness be apparent after death, owing to the arteries having contracted and expelled the blood into the veins. Points of redness are sometimes seen due to minute extravasations of blood.

The colour of *venous* congestion is generally more or less dark-red, but may be blue or purple or livid, while the veins are seen distended and forming a network.

Organs are often said to be congested in post-mortem descriptions, when this has not been the case in reality during life, simply because the blood has gravitated after death into dependent parts, and has thus given rise to this appearance. Tissues also are subject to post-mortem staining by the colouring matter of the blood, which may simulate congestion. The results of congestion already described may be evident after death, such as dropsy, &c., and if it has been long-continued, considerable changes in the physical characters and structure of organs may be observed.

CHAPTER II.

DROPSY. HYDROPS.

DROPSY is only a symptom, though often a very important one, of some general or local morbid condition. It consists in an accumulation of fluid which has escaped from the blood vessels, either in the subcutaneous cellular tissue, in serous cavities, in the cellular tissue of certain organs, or in all these parts at the same time. Terms are used to express the site of the dropsy as follows:—Dropsy of the subcutaneous cellular tissue, if more or less general is named *anasarca*, if localized, *œdema*; *hydrothorax* signifies accumulation in the pleuræ; *hydropericardium* in the pericardium; *ascites* in the peritoneum; *hydrocephalus* in the ventricles of the brain or arachnoid cavity; *œdema* is the term applied to the dropsy of organs, *e.g.*, œdema of the lungs. If there is dropsy both of the cellular tissue and serous cavities, it is said to be *general*.

It is necessary just to mention certain morbid conditions, which are known as "spurious dropsies," but which really have no pathological relation to dropsy. They include ovarian dropsy, which is a cystic disease of the ovary; accumulations of fluid in the interior of hollow organs, as the result of obstruction at an orifice or inflammation, such as dropsy of the uterus (hydrometria), or of the gall-bladder; certain serous effusions consequent upon inflammation, *e.g.*, hydrocele, and acute œdema of the glottis; dropsy of the kidney (hydronephrosis), which is either due to cystic disease, or, more frequently, to obstruction of the ureter and consequent accumulation of urine and products of inflammation within the pelvis of the kidney, which gradually destroy this organ.

CHARACTERS OF DROPSICAL FLUID.—This is almost always thin and watery; either quite colourless or light yellow as a rule, but sometimes tinged by the colouring matter of the blood or bile; clear and transparent, or rarely opalescent; usually varying in its specific gravity from 1008 to 1012 or 1014. Its reaction is generally alkaline, but occasionally neutral or slightly acid. Chemically it is allied to the serum of the blood, consisting of water holding in solution albumen, alkaline and earthy salts, especially chlorides, and extractive matters, but the proportion of these varies much in different parts and in different cases, especially the amount of albumen, and the composition is never identical with that of blood-serum, the proportion of solids being much less. Fat, especially cholesterine, fibrin, or pigments are sometimes present, and urea in one special form, viz., in renal dropsy.

PATHOLOGICAL CONDITIONS CAUSING DROPSY.—A dropsical accumulation is either the result of excessive flow of fluid out of the vessels; of deficient absorption; or of both combined; in short the balance between exhalation and absorption is in some way disturbed. This may be due to the following pathological conditions.—

1. Over-distension of the vessels in the different forms of con-

gestion, but especially that dependent upon mechanical interference with the return of blood by the veins, is one of the most common causes of dropsy, which is then due both to an excessive escape of fluid from the vessels, and to their diminished power of absorption. Obstruction to the circulation on the right side of the heart thus causes more or less general dropsy, beginning in the feet and ankles and extending upwards, and this may also be due to serious impediment in the lungs. Obstruction on the left side of the heart will lead to œdema of the lungs, because the pulmonary vessels are distended. Any local obstacle will cause limited dropsy. Thus interference with the circulation through the portal vein or its ramifications is followed by ascites; a clot in a vein of the arm or leg, or external pressure upon it, will give rise to œdema of the extremity affected. Hydrocephalic accumulation is chiefly the result of pressure upon the small veins returning the blood from the ventricles of the brain. Gravitation necessarily influences much the seat of this form of dropsy, and may itself induce it under certain conditions. Active congestion does not give rise to much dropsy as a rule, but it often causes local œdema.

2. A feeble and relaxed state of the vessels and tissues, in consequence of which the former readily yield and allow transudation of fluid, often aids in the production of dropsy. The œdema of the feet and ankles which is met with in many cases of general debility is partly due to this cause, being assisted by the weakened cardiac action, which induces mechanical congestion.

3. An unhealthy condition of the blood may occasion dropsy, especially if this fluid is very watery, deficient in albumen, or contains certain morbid materials, such as urea. Under these circumstances its liquid portion readily transudes. This cause often aids materially in the production of all kinds of dropsy, but it is the main influence in the causation of that attending anæmia, and is not unimportant in renal dropsy.

4. It is supposed by some authorities that dropsy depends chiefly on a withdrawal of the nervous influence in connection with the vessels, and experiments have been made to prove that so long as the nerves are intact dropsy will not occur, even if the veins are over-distended. There can be no question that the nervous system does exercise considerable control over the processes of exhalation and absorption, and will thus influence the occurrence of dropsy, but there is not sufficient reason to believe that it occupies the important position attributed to it by some pathologists as a cause of this symptom. Œdema is not uncommonly observed in paralysed limbs.

5. A deficient power of absorption on the part of the lymphatics has been considered to assist in giving rise to dropsy in some instances. Possibly this may exercise some influence in many cases of cardiac dropsy, the chief lymph-ducts being unable to empty themselves into the distended veins.

Causes.—Such being the pathological conditions with which dropsy may be associated, and which are often more or less combined, its *causes* may be summed up as follows:—

The appearances produced by anasarca or œdema are swelling, with pitting on pressure, the skin being generally pale but sometimes congested. The degree of enlargement varies much; it may be so great as to cause the skin to assume a tense, shining aspect, or even to burst or slough. The vitality of dropsical tissues is impaired and hence they are very liable to low inflammation from slight irritation. When fluid accumulates within serous cavities, it may or may not produce evident enlargement, but its presence can be made out in most cases by certain "physical signs" to be hereafter described. The subjective symptoms accompanying dropsy of external parts are more or less discomfort and uneasiness, with a feeling of tightness or stiffness, but no actual pain or tenderness. An accumulation of dropsical fluid interferes mechanically with organs, and thus may cause most serious disturbance of their functions. In certain parts it may lead to a rapidly fatal issue, as, for instance, in the case of œdema of the glottis.

The general symptoms will necessarily vary according to the cause of the dropsy. If it is at all considerable in amount, the normal secretions are as a rule deficient in quantity.

DIAGNOSIS.—It is usually not difficult to determine whether dropsy is present, but the chief point in diagnosis is to make out its cause. In order to ascertain this of course it is necessary to observe what other symptoms are present, both local and general, and to examine carefully those organs diseases of which are known to occasion dropsy. Much help may, however, be derived from a consideration of certain facts with regard to this symptom itself, as follows:—

1. *Its place of origin, seat, and extent.*—*Cardiac or pulmonary* dropsy begins in both feet and ankles and extends upwards, ultimately becoming more or less general. Ascites only follows after the circulation through the liver has been for some time obstructed. *Renal* dropsy frequently starts in the face and upper part of the body, especially about the eyelids where there is much loose cellular tissue, and in the hands because they are exposed. It may speedily spread all over the body, and involve all the serous cavities, though not usually to a great extent. *Hepatic* dropsy is confined to the peritoneal cavity at first, because the portal system of veins is alone interfered with. The abdomen may become considerably distended, without there being any dropsy elsewhere, but in most cases after a while anasarca of the legs set in, in consequence of pressure exercised by the fluid upon the vena cava inferior. Anasarca of the legs and ascites may appear simultaneously, should there be any *pressure on the vena cava* just before it passes through the diaphragm. *Anœmia* never causes much dropsy; it is always limited to the subcutaneous tissues; and is usually only seen about the feet and ankles, or in the loose tissue of the eyelids. *Local* dropsy, as, for instance, when it is limited to one leg or arm, always indicates some local cause. Rarely the *superior cava* is pressed upon, and dropsy of the upper part of the body is the consequence.

2. *Its rate and mode of progress.*—*Cardiac* dropsy is generally slow

and gradual in its progress, liable for a time to some variation according to position, but ultimately this does not influence it much. It may increase rather quickly from some acute complication in connection with the lungs. *Renal* dropsy, if acute, may be extremely rapid in its course, in some cases producing enormous enlargement of the body generally, and obliterating the features in a few hours. This is the only form of dropsy in which such a mode of progress is observed; it may also disappear in the same rapid manner. *Hepatic* dropsy usually progresses slowly and steadily. That of *anæmia* comes and goes easily, being often present about the feet in the evenings, but disappearing with a night's rest, while the eyelids are puffy in the mornings.

3. *The effect of pressure* is said to distinguish between *cardiac* and *renal* dropsy, but this is a very unreliable sign. The latter is stated to pit much less and to retain the impression longer, elasticity not being quite lost.

4. The *appearance* of a dropsical part may indicate its cause. Thus in some cases of *renal* disease the skin presents a very peculiar dull-white, pasty aspect. In *cardiac* dropsy signs of venous congestion are often present, the skin being shining and tense.

5. *Characters of the fluid.*—That of *renal* dropsy is of a very low specific gravity, containing only a small quantity of albumen, and *urea* can in some instances be detected in it.

6. *The effects of treatment.*—The dropsy of *anæmia* is easily got rid of; the *renal* form can frequently be removed for a time by appropriate treatment; it is difficult to bring about absorption of *cardiac* dropsy as a rule, if it is at all considerable in amount, and it is liable to return speedily.

TREATMENT.—The objects to be kept in view in the treatment of dropsy are:—1. Its removal. 2. The prevention of its recurrence. 3. The prevention as far as possible of its injurious effects, if the fluid cannot be removed. The particulars of treatment must necessarily be governed by the cause of the dropsy and the organ which is affected, but there are certain general principles which need attention, of which an outline will now be given, as well as of the manner in which they are to be carried out.

1. *Removal of the cause.*—As illustrations may be mentioned the relief of any pressure or constriction affecting a vein; or of an attack of acute bronchitis in cases of cardiac disease, which may temporarily aggravate considerably dropsy due to this cause. Of course it is highly important to attend specially to any organ, a morbid condition of which is keeping up dropsy, and to try to cure this, or at all events to render the organ capable of performing its functions, so far as this is possible.

2. *Attention to rest, position, and regulated pressure.*—Far too little heed is usually given to the question of *rest* and *position* in the treatment of dropsy. The part affected should, if necessary, be maintained continuously and for a long time in an elevated posture. Much benefit may often be obtained by keeping the legs, if the seat of anasarca, on a level higher than the body; or by raising an œdematous scrotum by means of a pillow of cotton-wool under-

neath. *Pressure* is also very valuable in many cases, if carefully and properly applied.

3. *Promotion of absorption of the fluid.*—This indication is carried out by employing diaphoretics, saline and watery purgatives, or diuretics, so as to promote free secretion by the skin, intestines, or kidneys, and thus remove some of the watery portion of the blood

The only *diaphoretic* that is of much practical value is some form of bath which promotes perspiration, such as the warm, vapour, hot air, or Turkish bath. Either of these may be used as frequently as circumstances require; and local baths may be employed with much advantage if the patient cannot sustain general baths. It is in the treatment of renal dropsy that they are most valuable, and especially of acute cases. An occasional bath is also useful in preventing this form of dropsy. Other diaphoretics are recommended, such as ipecacuanha, antimony, spirits of nitre, liquor ammoniæ acetatis, or citrate of potash, but these medicines are of little or no service for this purpose in cases of dropsy.

Watery purgatives are frequently most efficient in relieving dropsy, but care must of course be exercised in their administration, as they tend to weaken a patient. The most important are extract of elaterium (gr. ⅙ gradually increased to gr. ½); jalap (℈ i to ʒ i); and cream of tartar (ʒ i to ʒ ij); the last two form a very effective combination. They may be given two or three times a week or oftener if required. Other purgatives are employed, such as gamboge, veratrum, podophyllin, calomel, or croton oil, but these are much less admissible ordinarily, though they are occasionally serviceable. There can be no doubt that the effect of pills administered by some quacks, which is sometimes really marvellous, is due to powerful drastic purgatives which they contain.

Diuretics are beneficial in some forms of dropsy. Those usually given are nitrate, acetate, or citrate of potash or soda in full doses freely diluted; cream of tartar in small doses; spirits of nitre; infusion or tincture of digitalis, or the powdered leaf made up into pills with other ingredients; squill in the form of tincture or pills; spirits or infusion of juniper; infusion of fresh broom tops; oil of turpentine. The following pill will be found in some cases to have a good effect, given every other night: ℞. Ext. elaterii, gr. ⅙ to gr. ½, Pulv. scillæ, gr. ½ to gr. i, Pulv. digitalis, gr. ½ to gr. i, Ext. hyoscyami, gr. 1½. M. fiat pil.

Digitalis is also used as an external application, poultices of the leaves being placed over the abdomen, or the powder rubbed in, or fomentations with its infusion employed. Gin or whisky freely diluted is undoubtedly efficacious as a diuretic in some cases.

Blood-letting is recommended in some instances, with the view of unloading the vessels and thus assisting the action of other remedies, but such treatment can rarely be indicated.

4. *Removal of the fluid by operation.*—If dropsy cannot be got rid of in any other way, it is necessary to have recourse to certain operations, and I believe they are often delayed until too late a period, and ought in appropriate cases to be performed, not as last resources,

PATHOLOGY AND ETIOLOGY. The causes, including those of a pathological nature, which give rise to hæmorrhage may be thus arranged:—1. *Traumatic.* A vessel may be directly injured, as by a cut or contusion; by hard and rough substances, such as a calculus in the bladder, a foreign body or dry hard fæces in the alimentary canal; or by the extension of ulceration, gangrene, or cancer. 2. *Congestion leading to extreme distension of the vessels.* All forms of congestion may end in hæmorrhage, but especially if the force of the circulation is at the same time much increased, the pressure becoming so great as to cause the vessels to give way. Therefore whatever can occasion considerable congestion may bring on hæmorrhage, which is then usually of the capillary variety. As illustrations may be mentioned hæmorrhage into the stomach, following cirrhosis of the liver; critical and vicarious hæmorrhages; those resulting from over-straining or local irritation; and that which follows *embolism.* 3. *Morbid conditions of the walls of the heart or coats of the vessels.* Among the most important are degeneration or aneurism of the cardiac walls; atheromatous or calcareous degeneration of the arteries; arterial aneurisms; varicose veins; degeneration or mere functional debility of the minute vessels. Where the vessels are not well supported, as in the brain, or when the tissues are functionally weak, hæmorrhage from this cause is much more likely to take place. The feeble new vessels in recent inflammatory exudations, and those in certain vascular cysts or villous growths, are very liable to give way. 4. *Abnormal state of the blood.* This often predisposes to hæmorrhage, *e.g.* in anæmia, especially if this is due to previous bleeding, scurvy, purpura, low fevers, particularly typhus and small-pox, the condition induced by bad diet, chronic diseases, and other lowering agencies. The most important morbid condition of the blood, however, which gives rise to hæmorrhage, is that which is met with in the so-called *hæmorrhagic diathesis* or *hæmophilia,* where excessive bleeding occurs spontaneously or from very slight causes; in this affection there is a marked deficiency of fibrin, with an excess of red corpuscles. A plethoric state of the vascular system is favourable to some forms of hæmorrhage, and hence this may be predisposed to by overfeeding, sedentary habits, and other causes of plethora.

Hæmorrhage may occur at any time of life, but it is most common about the period when growth and development are proceeding rapidly, and in advanced life when the tissues have undergone degeneration. It is also prone to affect different parts at different ages; thus in the young epistaxis is frequent; in young adults hæmoptysis; later on, hæmatemesis, melæna, and hæmaturia are more common; and in old age cerebral apoplexy. Some individuals are much more liable to hæmorrhage than others.

ANATOMICAL CHARACTERS.—When hæmorrhage has taken place from the capillaries of a mucous membrane, it is often impossible even on the most careful examination to detect the vessels from which the blood has escaped. Some believe that under these circumstances there has not been any actual rupture. Generally the source of the bleeding may be discovered, and remnants of the blood are seen. *Extravasations* vary in size from minute points to arge clots, which are either distinct and well-defined or mixed up with the tissues of the structure involved; there may be one or more. The blood is generally found coagulated more or less firmly, and presents a dark colour at first. It may cause irritation of the surrounding tissues, as evidenced by redness, inflammatory exudation, softening, or even the formation of an abscess. If the extravasation does not soon prove fatal, the following changes take place in it:—1. The colour gradually becomes paler, changing to brown or yellow, and ultimately it may become almost white; at the same time a granular pigment often forms, with crystals of hæmatoidine. 2. The clot contracts in size, becoming firmer and being surrounded with a strong fibrous capsule; it also frequently itself undergoes organisation into fibrous tissue and becomes vascularised, in which condition it may remain permanently. 3. In some cases it is absorbed, leaving a cystic cavity containing fluid, which may ultimately be taken up also, the walls of the cyst coming together and a hard cicatrix remaining, which is sometimes coloured by pigment. Occasionally nothing is left but altered blood pigment of a yellow or black colour, especially on membranes; or there may be no trace of a previous hæmorrhage except a puckering and contraction. In some instances a clot softens and assumes a puriform appearance.

Symptoms and Effects.—Active hæmorrhage is often preceded by premonitory symptoms. There may be general excitement of the circulation, with a quick, sharp, and full pulse; or local sensations of weight or fulness and heat are complained of, with increased pulsation, the extremities being at the same time cold. Special symptoms frequently indicate the approach of bleeding in connectionwith particular organs.

The actual symptoms may be *general* and *local.*

General.—According to the quantity of blood lost, and the rapidity with which it escapes, hæmorrhage may either prove speedily fatal; or give rise to faintness or syncope; or merely originate an anæmic condition.

Local.—These necessarily vary with the seat and amount of the hæmorrhage. Instant death may result from the mere local effects of the blood effused. The symptoms usually observed are dependent upon:—*a.* Mechanical interference with the functions of an organ, owing to the mere presence of the blood, as when it escapes into the pericardium and presses upon the heart; or when a large quantity accumulates in the bronchial tubes. *b.* Destruction of tissues, which may be broken up or lacerated. This generally happens when extravasation takes place into the substance of an organ, the functions of which are thus materially disturbed. *c.* Irritation by the coagulated blood, which may give rise to more or less local inflammation, with its accompanying symptoms. *d.* Excitation of certain acts which have for their object the discharge of the blood, should it escape on a free mucous surface. Thus blood in the stomach often causes vomiting; in the air-passages it excites cough. The amount and characters of the blood which is rejected vary considerably, and valuable indications are usually thus afforded as to the source of a hæmorrhage. It is often more or less mixed with secretions and other substances. The presence of blood may be indicated by *physical signs*, as, for instance, when it accumulates in the bronchial tubes or pleural cavity.

Treatment.—It is only intended at present to point out the general principles and indications which are applicable to the treatment of hæmorrhages, as each variety will demand particular consideration in future chapters.

1. The first indication is to stop the bleeding, should this be desirable, and to prevent its recurrence. It is not always advisable to check hæmorrhage, provided it is not serious in amount, for it may be the means of warding off some worse evil, as in many cases of bleeding from piles, or in those of epistaxis. Usually it needs to be stopped, and the following are the measures to be employed for this purpose:—

a. Absolute rest of the body in the horizontal posture is frequently indicated; and, so far as this is practicable, the part from which the blood comes should be kept quiet, every disturbing action being avoided, such as cough in hæmoptysis or vomiting in hæmatemesis. At the same time the circulation must be calmed, and everything that can excite the heart be guarded against. If the heart is acting unduly, cardiac sedatives are most valuable. Venesection is employed with the view of lowering the action of this organ, but this measure is very rarely indicated.

b. Attention to *position* is sometimes most serviceable, with the object of assisting the return of blood by the veins. Everything that can impede the venous circulation must be avoided.

c. The administration of astringents in full doses is generally called for in medical practice, the most important being acetate of lead, gallic and tannic acids, sulphuric acid, alum, oil of turpentine, ergot of rye, matico, and tincture of steel. Some of these may be advantageously combined, and either tincture of opium or digitalis frequently forms a most useful addition. A subcutaneous injection of ergotine has been employed with success. Everything in the shape of food or drink should be taken cold, and stimulants must not be given unless absolutely required. In some hæmorrhages the constant sucking of ice is exceedingly serviceable.

d. Local remedies are commonly indicated, such as pressure; astringent applications; cold, especially in the form of ice, which may be usefully applied to *neighbouring* parts, *e.g.*, to the chest or epigastrium in hæmoptysis and hæmatemesis, or even to distant parts, as in cases of epistaxis. It may be necessary to have recourse to surgical measures, such as the actual cautery, torsion, or ligature.

e. It is highly important to improve the general condition of the patient and the state of the blood, should these be at fault and give rise to a tendency to bleeding, by the exhibition of good diet, tonics, tincture of steel, and similar remedies. In this way hæmorrhage may be prevented when it tends to recur. On the other hand, when it is associated with a full plethoric habit, the administration of saline aperients from time to time is very serviceable, while the diet must be restricted.

f. Sometimes it is advisable to draw off blood to parts distant from the seat of hæmorrhage by means of heat or sinapisms to the extremities, Junod's boot, leeches, &c.; or to prevent it from entering a part by the aid of pressure upon the main arteries.

2. The second indication is to attend to the general effects of the loss of blood. *Syncope* must be treated by position and stimulants, as will be more fully described hereafter. Anæmia calls for the administration of some form of iron, with proper dietetic and hygienic management.

3. The local effects of effused blood must also receive attention. In rare cases it may be desirable to have recourse to some surgical operation in order to remove an accumulation. Usually it is only requisite to keep the part affected entirely at rest, and to employ measures which promote the absorption or removal of the effused blood. Iodide of potassium and blisters are often very useful for the purpose of aiding absorption. If inflammation is set up, this must be treated by appropriate remedies.

CHAPTER IV.

INFLAMMATION.

WITHOUT attempting any comprehensive definition of this most important pathological process, I proceed at once briefly to consider the principal points in connection with it, and to endeavour to give such information regarding the present state of knowledge on the subject as the limits of this work permit. It will be most convenient first to describe the morbid changes which take place in inflammation, and to point out in what they essentially consist.

HISTOLOGICAL CHANGES. These may be studied by irritating the transparent vascular tissues of animals, and watching the results with the aid of a microscope. The web of the frog's foot, its mesentery or tongue, and the bat's wing are most commonly employed for this purpose, and the following phenomena are observed:—

A. *Changes in connection with the Blood-vessels, Circulation, and Blood.* The phenomena associated with the vascular system constitute a most important element of the inflammatory process, and they occasion some of the more obvious anatomical signs of the change, such as redness, increased heat, &c.

1. *Blood-vessels.*—In almost all cases an immediate dilatation of the small arteries is observed, and they become elongated and tortuous; the dilatation increases for some 10 or 12 hours, and then remains stationary. Rarely there is a primary contraction of short duration. The veins enlarge after a while, and they as-

sume a varicose or aneurismal aspect, presenting little irregular bulgings and contractions. The capillary walls undergo structural changes in course of time, fat granules accumulating in them, especially around the nuclei, and they send out processes by budding, which finally join together.

2. *Circulation.*—There is at first *increased rapidity* in the flow of blood, except when contraction of the arteries takes place. This is soon followed, however, by a rather sudden return to the normal rate of movement, and afterwards the circulation becomes slower, this change commencing in the veins. A to-and-fro oscillation is then often seen, and finally complete *stasis* or stagnation occurs, the vessels appearing to be crowded with red corpuscles. Neighbouring vessels frequently present all these different conditions with regard to movement, and around the centre of stasis the vessels are usually over-distended, the circulation being slow, while still beyond this circle the current of blood is more rapid.

3. *Blood.*—Important phenomena are observed in connection with the blood corpuscles.—The *white corpuscles* accumulate in the vessels, especially in the veins, and they adhere to the walls, forming a continuous motionless layer, the central current still persisting until stasis is brought about. Some observers believe that there is an actual production of these corpuscles in the inflamed part, and that thus their number is increased. After a time they penetrate the walls of the capillaries, and may be observed in various stages of their transit, forming button-shaped elevations, then hemispherical prominences, then pear-shaped bodies, and finally separating altogether. This process is due to the power which these corpuscles possess, by virtue of their amœboid nature, of spontaneous movement, of altering in shape and digesting the protoplasm of the vascular walls, so that no actual openings are left in the vessels to indicate where they have escaped. To the liberated white corpuscles the name *leucocytes* is given, and after they leave the vessels they send out processes, assume peculiar shapes, and *migrate* far and wide into the surrounding tissues, at the same time often undergoing a process of division and thus becoming increased in number. The *red corpuscles* exhibit the same tendency to aggregation and stasis, and they may so adhere to each other that their outlines are quite obscured. They also migrate through the walls of the vessels, especially the capillaries, but not nearly to the same extent as the white blood-cells. Dr. Lionel Beale affirms that in inflammation minute particles of *bioplasm* or germinal matter of the blood pass through small rents or fissures in the capillary walls, and afterwards grow and multiply by division. Some of these particles, he says, are detached from white corpuscles. He considers that most of the particles seen outside the vessels originate in this way, and not from the direct transit of white corpuscles.

Another phenomenon almost invariably occurring in connection with the blood, is the exudation of its liquid portion out of the vessels into the surrounding tissues. Though usually called *liquor sanguinis*, the exuded liquid is rarely identical with this fluid in its composition. It may be mere serum, but as a rule contains fibrin s well as albumen, and also a considerable proportion of phos- hates, chlorides, and carbonates. Its nature and quantity will ary much according to the seat and intensity of the inflammation, s will be more fully alluded to further on.

The alterations thus far described in connection with vascular ssues cannot of course be observed in those which have no vessels, ch as cartilage; but they may then be noticed in the vessels of e neighbouring tissues from which the nutriment for the non- ascular structures is derived.

B. *Changes in the affected tissues.* The nutritive process in the flamed tissues themselves becomes speedily disturbed when in- ammation sets in, and in some structures this is the only percepti- le deviation from health, there being no appreciable amount of cudation. Such inflammations are named *parenchymatous*, and are bserved in connection with cartilages and certain organs, such as e kidneys. The first tendency is to the active production of cells, -*cell-proliferation* or *germination* as it is termed; this results from the crease in size of those already existing and of their nuclei, and e division of the latter along with the protoplasm of the cell-con- nts, which frequently assume a granular appearance, new cells ing thus produced by *endogenous* formation. They also under- many changes in form and exhibit amœboid movements. This ll-proliferation is in proportion to the intensity of the inflamma- n, but varies greatly in different tissues. In epithelial structures is very rapid; less so in connective tissue, cartilage, bone, and e cells of organs; and it does not occur at all in the higher tis- es, such as nerve. These new cells are prone to decay, especi- ly if they are very quickly produced and the inflammation has en severe; but they may develope into a permanent tissue, hich tends to be of lower organization than the original. Where ter-cellular substance exists, this often softens and breaks down; d the entire structure may become at last completely destroyed, e histological elements being involved in the destruction. Dr. ale describes the *bioplasm* of inflamed tissues as increasing great- in amount.

PATHOLOGY. I proceed now to consider the nature and origin of flammation, and to attempt to explain the phenomena described ove. Formerly it was believed that the various changes observed inflammation could be accounted for on physical principles. us the disturbance of the circulation and ultimate stasis were attri- ted to dilatation of the vessels; to blocking up of the capillaries the successive production of white corpuscles, and the adhesion these, as well as of the red globules, to the walls of the vessels d to each other; to the formation of minute coagula; and to spissation of the liquor sanguinis. Exudation was believed to the necessary result of this stasis and of the dilatation of the ssels. Of late years, however, there has been a growing con- tion that the phenomena of inflammation are due to some dis- bance in the mutual vital relations of the tissues, blood-vessels, d blood. This pathological process, affecting the nutritive con- ions and being in fact merely an alteration in nutrition, results from some injury to or irritation of a tissue, either direct or indirect. An impression is thus produced on the centripetal or sensory nerves, which is communicated to the vaso-motor centre, thence reflected to the centrifugal or vaso-motor nerves and conveyed by them to the vessels, which consequently dilate, probably owing to a paralysis of their muscular coat. The primary acceleration of the flow of blood may be due to this dilatation, but the subsequent phenomena are probably the result of some alteration in the vital properties of the living tissues, including the coats of the vessels, the blood, and the surrounding structural elements. The vascular walls are so modified as to lead to stasis of the blood-current, the corpuscles readily adhering to them, while they allow of the free passage of liquid and leucocytes, having lost their resisting power. The blood-corpuscles also exhibit an increased tendency to aggregate together. With regard to the cell-proliferation and increase of bioplasm, this is supposed to be due to the direct influence of the abundant supply and frequent change of the nutritive fluid which escapes from the vessels in stimulating growth and development, and to the increased heat accompanying the inflammatory process. It is not unreasonable to suppose, however, that the primary irritation may immediately set up this overgrowth, or that it may be originated through the nerves directly; while it may possibly itself tend to promote a free escape of fluid from the vessels, because it causes a greater demand for nutriment. Some pathologists believe that the whole process of inflammation is due to a direct change in the vessels or blood, set up by the molecular tissues of the part affected, and that it is not produced by any nervous influence.

PATHOLOGICAL TERMINATIONS AND PRODUCTS. 1. The changes already described having taken place to a greater or less extent, what is termed *resolution* may follow, viz., a subsidence of the vascular disturbances and the absorption of any exudation, the tissue affected being restored to its normal condition. Any leucocytes which are present either undergo fatty degeneration before absorption, or possibly may re-enter the blood vessels or lymphatics. Resolution may take place very quickly, this being termed *delitescence;* or *metastasis* may happen, *i.e.*, the disappearance of inflammation from one part with its simultaneous appearance in another.

2. *Exudation and Effusion.*—As has been already stated, inflammation is usually attended with an escape of fluid from the vessels, varying much in quantity and composition. The material exuded may be either *serum*, *fibrinous exudation* or *lymph*, *blood*, or *mucin*.

a. Serum.—Examples of this effusion are well seen in connection with inflammation of serous membranes, and in the submucous tissue in certain parts. The fluid is not uniform in its composition and characters, but contains a variable amount of albumen and frequently also a little fibrin, with a considerable quantity of phosphates and chlorides. It may remain for a long time unaltered, or is absorbed if the inflammation subsides, or becomes more or less purulent.

b. Fibrinous Exudation, Lymph, Coagulable Lymph, Inflammatory *xudation.*—These terms are applied to an exudation which attends me forms of inflammation, the material exuded containing more r less fibrin, and being spontaneously coagulable. There is ally, however, no distinct line of demarcation between this exu- ation and inflammatory serous effusion. It contains a number of ucocytes, as well as cells resulting from proliferation of those of e involved tissue, and Dr. Beale describes particles of *bioplasm* s being present in it.

Two kinds of lymph are recognised, viz., the *plastic* or *fibrinous*, hich contains abundant fibrin-forming ingredients, tends to oagulate, and promotes tissue-development; and the *aplastic*, *rpuscular*, or *croupous*, in which there are a large number of cells, ith but little tendency to organisation, but rather a proneness to egeneration and to the formation of pus or other low products. he state of the patient, the seat and intensity of the inflammation, nd other conditions influence materially the nature of the exuda- on.

After inflammation has subsided the exudation frequently under- oes organisation into a new tissue; some are of opinion that only e leucocytes and the cells produced by proliferation, or the particles f bioplasm (Beale) become developed, the liquid portion merely ourishing these; others believe that the fibrin coagulates and brillates, and itself contributes to the formation of tissue. Pro- ably most of the new material is usually derived from cell- evelopment, the cells being partly leucocytes and partly due to roliferation. Some kind of connective or fibrous tissue is that enerally produced, but bone, elastic tissue, epithelium, or fat ay be ultimately formed. Certain of the higher tissues, such as uscle or nerve, are never developed under these circumstances. his organisation is well seen in the changes which occur in the ranulation-tissue by which wounds cicatrize, and in the adhesions nd thickenings formed in connection with inflamed serous mem- ranes. The consequences of these changes are often very seri- us, structures becoming thickened, hardened, contracted, or ound together, and transparent tissues being rendered opaque.

After organisation a process of degeneration may set in, as hown by wasting or withering, the substance becoming dry, ellow, horny, and stiff; by fatty or liquefactive change, which ay lead to its absorption; or by the formation of black pigment. imilar changes may occur in the products of corpuscular lymph.

c. Blood is sometimes present in inflammatory exudations. It s partly the result of migration of the red corpuscles, but may e due to the actual rupture of vessels, especially of those recently ormed.

d. Mucin.—In inflammation of mucous membranes this substance s sometimes met with, and gives a tenacious, stringy character o the fluid discharged from the surface.

3. *Suppuration or Formation of Pus.*—The tendency to suppura- ion varies according to the tissue affected and the constitutional ondition of the patient, but it generally is more liable to take

place if the inflammation is very severe and concentrated. Pus may form on a free surface and be discharged, being then often mixed with other materials; it may accumulate in cavities, such as those of serous membranes; or it may involve the substance of tissues and organs, either as a circumscribed abscess, or as diffuse purulent infiltration. In its physical characters it is a thick, viscid, pale-yellow liquid, odourless, alkaline in reaction, with a specific gravity of about 1030. It consists of a fluid—*liquor puris*—in which float pus-corpuscles and other microscopic particles. Liquor puris is an albuminous fluid, but also contains salts, pyin, chondrin, and fat. The corpuscles closely resemble pale blood-corpuscles in size and appearance, being more or less round or sometimes irregular, granular, and having one or more nuclei, which are rendered more evident by acetic acid and often break up when acted upon by this reagent. They have the power of spontaneous movement and migration, and can alter in form as well as increase in number by fission. Dr. Beale describes pus-corpuscles in the *living* state as being masses of bioplasm without any cell-wall, which assume a variety of forms but are never spherical, send out protrusions in all directions, these becoming detached and forming new corpuscles, and which are capable of spontaneous movement. He says that when *dead* they assume the spherical shape, their movements cease, a sort of cell-wall forms, they become more granular, and bacteria are developed in them. It is in this condition they are usually seen under the microscope. It is now generally considered that the great majority of these cells, especially in the earlier stages of inflammation, are merely leucocytes. Beale believes they are derived from the particles of bioplasm which escape. Afterwards others are formed by the proliferation of the cells and germinal matter of the tissue affected, and they increase in number by cleavage and endogenous formation. These leucocytes possess the power of destroying the tissues with which they come into contact, and it is partly in this manner that an abscess makes it way to the surface.

Various kinds of pus are described, such as *healthy* or *laudable; ichorous* or *watery; serous; sanious;* &c. It may decompose and form very noxious gases, and sometimes undergoes physical and vital changes if not discharged, its fluid portion being absorbed, its cells becoming withered and undergoing fatty degeneration, so that it is converted into a cheesy mass, containing fat granules, shrivelled cells, and nuclei. Ultimately it may calcify.

4. *Softening* of tissues is not an uncommon result of inflammation, and it may proceed to such a degree as to end in the complete breaking up and destruction of the structures affected. This may be illustrated by the softening which accompanies inflammation of the brain.

5. *Induration* is another consequence of inflammation, especially when chronic, being due to the substitution of an imperfect fibrous tissue for the normal structures.

6. *Interstitial absorption* is sometimes observed, as in the case of inflammation of bone.

products, it may be stated that their general tendency is to produce materials which are capable of organisation.

In connection with *mucous membranes* three varieties of inflammation are described, viz., *catarrhal; croupous, membranous, plastic,* or *fibrinous;* and *diphtheritic.*

Catarrhal.—This is the ordinary form. It commences with hyperæmia and swelling of the membrane, which is at first abnormally dry. Soon, however, there is an increased secretion of viscid mucus, containing abundant cells derived from the proliferation of the epithelium and from leucocytes, and if the inflammation continues the discharge assumes a more or less purulent appearance, owing to the large number of cells present, many of which have the precise characters of pus-cells. The mucous glands and follicles enlarge and become also filled with cells. In some cases the submucous tissue becomes infiltrated, and if it is of lax texture a considerable amount of serum may collect in it. Abrasions or ulcers of the membrane are not unfrequently originated. If the inflammation becomes chronic, considerable changes are produced in the structure of the membrane and its glands.

Croupous.—This variety differs from the former in that a layer of so-called *false membrane* is deposited on the surface, varying in thickness and consistence. It is formed of coagulated fibrin, either amorphous or fibrillated, enclosing epithelium and other cells; or it may be entirely made up of altered epithelium cells without any fibrin. Even when distinctly fibrillated it shows no tendency to become permanently organised.

Diphtheritic.—This is supposed by some pathologists to differ from *croupous* inflammation in that there is a fibrinous exudation, not only upon but into and beneath the mucous membrane, which as a consequence is destroyed and converted into a slough, and an ulcerated surface is left on its separation.

It will thus be seen that inflammation of mucous membranes differs from that of serous membranes in that the products have no tendency to become organised, owing to the abundance of cellular elements which are discharged in the secretions.

SYMPTOMS. 1. *Local.*—If an inflamed part is visible, it generally presents three well-known *objective* symptoms, viz., *redness, swelling,* and *increased heat.*

The *redness* varies in degree and hue, the latter usually tending towards brightness. It is more marked towards the centre of the inflamed area and fades off at the circumference, disappearing more or less under pressure. It is due chiefly to the overloading of the vessels and to the blood stasis, but may be partly the result of migration of red corpuscles or rupture of vessels and consequent extravasation. In the case of a non-vascular tissue, it is the neighbouring structures from which this receives its nutriment which exhibit redness.

The amount of *swelling* is very variable, and it may be accompanied with a hard or soft feeling, according to circumstances. The increased quantity of blood in the affected part, and the pre-f different exudations and effusions, as well as the prolifer- tissue, will account for this symptom.

sed local heat is often quite evident to the touch, but it may detected by the thermometer. It is mainly the result of eased activity of chemical and nutritive changes in the in- tissue, and to some extent of the augmented flow of blood it. Dr. Beale attributes the rise in temperature to the rowth of bioplasm.

objective changes are also associated with internal inflam- , but of course they are then only observed on *post-mortem* ıtion. It is often possible, however, to determine during internal organs and tissues are inflamed, by the aid of *examination.*

s one of the most frequent *subjective* symptoms of inflamma- intensity and characters differing much according to the ffected; it may be entirely absent, however, even when es are involved inflammation of which is usually attended ıch pain. Anything that disturbs or irritates the affected l generally aggravate the painful sensations, while there is always *tenderness* on pressure, which may exist without any eous pain. Other morbid sensations, not amounting to ›ain, are often complained of. These symptoms are neces- ue to the nerves being affected in some way, either being l in the inflammatory process or pressed upon by exuda- *Sympathetic* pains are sometimes referred to parts distant e seat of inflammation; or pain may only be felt in some e which is supplied by the same nerve as that which is

unctions of inflamed organs and tissues are always disturbed, se of adjoining parts are often implicated as well. This ınce is the result of actual changes in the textures; of the ical effects of the various materials which accumulate; and cts which these frequently excite with a view to their remov- as cough in bronchitis. By observing therefore to what any symptoms present are referable, the seat of an inflam- can generally be fixed upon. Secretions are always modi- o quantity and composition when the organs forming them ımed.

neral or Constitutional.—At present it must suffice to state *general* symptoms of *acute* inflammation are those of *fever* or which will be hereafter described. The fever is usually of *mmatory* type at the outset, but differs much in its intensity, ly according to the tissue affected. The occurrence of tion is often indicated by a severe fit of shivering, and the then apt to become *adynamic* or *hectic*. *Typhoid* or *adynamic* ns are also liable to be developed under other circum- but particularly if the inflammation assumes a low type, erminates in gangrene.

rule, the *blood* is hyperinotic, containing excess of fibrin gulating firmly, often presenting the "buffy" coat. Water ess, but albumen and salts are deficient. The red corpuscles show a marked tendency to run together, and under the microscope are seen to form "rouleaux."

The fever attending inflammation is *symptomatic* or *sympathetic*, and it is supposed to result either from paralysis of the vaso-motor nerves generally; or from increase in the temperature of the blood as a whole, in consequence of the local excessive production of heat.

Etiology. A. *Predisposing causes.*—These influence not only the occurrence of inflammation, but also the part it affects and the variety it assumes. They may be considered as *general* and *local*.

1. *General.*—The condition of the entire system, but especially that of the blood, exercises a considerable influence in predisposing to inflammation. The most important general predisposing causes are debility with impoverishment of the blood, however originated; plethora, especially from over-feeding, with excessive indulgence in stimulants and general luxurious habits; and, above all, the presence of some morbid material or poison in the blood, as in the case of the eruptive fevers, gout, rheumatism, syphilis, diabetes, &c., or when the products of tissue-change accumulate in the blood, either from too rapid disintegration, as in fevers, or from deficient action on the part of the excreting organs, especially the kidneys and skin. Children and old people are most liable to inflammations on the whole, but this does not apply to all structures. Persons of sanguine temperament are also said to be more predisposed than others.

2. *Local.*—The chief local predisposing causes of inflammation are mechanical or passive congestion; defective nutrition of the tissues, their power of resistance being impaired, as after a previous attack of inflammation, or when the vessels are in a state of degeneration; and impaired innervation. The last cause acts partly by direct interference with the nutritive process, and by lowering the vitality of the tissues; but chiefly by diminishing the power of sensation and motion, so that irritants are allowed to act for a long time without the patient being aware of their presence, who is also unable to remove them.

B. *Exciting.*—1. *Mechanical injury or irritation* of various kinds is a common cause of inflammation. Thus it may result from wounds or bruises, calculi, extravasated blood, retained excretions, worms, tumours, gouty concretions, and different deposits.

2. *Chemical irritants* also frequently excite inflammation, and under this head may be included that resulting from the application of extreme heat or cold. A specific kind of inflammation may be produced in this way, as, for example, when croton oil, tartar emetic, or a blister is applied to the surface of the skin; or when arsenic or cantharides is introduced into the system, the former always affecting the stomach, the latter the kidneys. The inflammation resulting from the contact of air with certain surfaces, or of pus or gangrenous fluids, comes under this category, as well as that due to improper food.

3. Certain *specific organic poisons* in the blood are most important causes of inflammation, each giving rise to its own *specific lesions*,

a. Removal of blood. This was the great remedy for inflammation in times past, but at the present day the tendency is to go to the opposite extreme, and to ignore blood-letting altogether. Blood may either be removed by *venesection—general blood-letting*—by which the heart's action is at the same time moderated; or it may be taken immediately from the vessels in the neighbourhood of the affected part, by means of leeches, cupping, punctures, scarifications, or incisions—*local blood-letting*. With regard to the former method, without entering into any discussion on the subject, I venture to express the opinion that it is not often required, and great care should be exercised in determining that any individual case demands it. As will hereafter be pointed out, inflammation of certain tissues and organs may necessitate venesection, but it should never be practised if the patient is debilitated, or if the inflammation is dependent upon some morbid poison in the blood. If performed at all it should be had recourse to at an early period, before inflammatory products have accumulated to any extent. Local blood-letting is frequently most serviceable, and there can be no doubt that it is not made use of to the extent which it deserves. By this means the vessels of a part can be materially relieved, and thus a most beneficial local effect produced, while the general bulk of the blood is not materially diminished or the patient injured in any degree.

b. Some powerful medicinal agents have of late years been much recommended in various inflammations, which exercise a direct influence upon the heart, diminishing the number of its beats. Of these the most important are *aconite, veratrum viride, and digitalis.* Tincture of aconite is strongly advocated by Dr. Ringer in certain inflammations, especially such as are not extensive or severe.

Tartar emetic has long occupied a prominent position in the treatment of certain inflammations, and justly so; it exerts a powerful influence over the heart, but acts in addition by increasing some of the secretions.

c. A very valuable class of remedies in some inflammations, if properly employed, are those which increase the different secretions and thus relieve the blood vessels, viz., *purgatives, diaphoretics,* and *diuretics.* The first of these must be used cautiously, but it is generally advisable to keep the bowels freely open, and purgatives are particularly useful when the blood is loaded with the products of decomposed tissues. The best *diaphoretic* is some form of bath, especially the vapour, hot-air, or Turkish bath. The new drug—*Jaborandi*—which is a powerful diaphoretic, may be found useful in some inflammations. Salines are frequently of much service. Of course these classes of remedies are severally contra-indicated if there is any local inflammation of the bowels, skin, or kidneys.

d. Local treatment.—There are certain important local means of subduing the increased vascular action in inflammation, in addition to bleeding. Among these the most valuable is the *application of cold.* It may be applied in the form of rags dipped in cold water or evaporating spirit lotions, cold irrigation, ice or ice and salt in a bag. It is in the early stage that this remedy is so useful, and also when the inflammation is quite superficial or affects structures near the surface, *Heat and moisture* act very beneficially in some cases, in the form of hot-water dressing, poultices, or hot fomentations. In others turpentine fomentations, dry cupping, mustard poultices, or blisters, are valuable. All these act by determining the blood to the surface. The application of belladonna has been recommended in inflammation of superficial parts.

2. The second indication is to endeavour to promote the absorption or removal in some other way of any morbid materials which have been exuded, so as to leave the implicated organ or tissue in as normal a condition as possible. This will be favoured by attention to many of the points already mentioned, such as *rest* and *position*. In order to aid absorption certain medicinal agents are extensively used. Of these *mercury* in some form is very commonly employed. In syphilitic inflammations this drug acts most efficiently, but as a rule it ought to be avoided, or at least used with great caution; a great deal of harm has been, and still is done by its indiscriminate use. *Iodine*, especially in the form of iodide of potassium, is often of much service. Liquor potassæ and the alkaline bicarbonates are also employed.

Local measures are frequently attended with excellent results, particularly the various forms of *counter-irritation*, such as blistering, painting with a solution of iodine, the use of irritating liniments, issues, setons, or the actual cautery. *Friction* and *regulated pressure* are in some cases most serviceable, and in practising the former it may be advisable sometimes to use absorbent liniments or ointments. Mercurial ointment is much employed in this way.

Absorption may undoubtedly be assisted in some instances by acting freely on the various secreting organs, especially by promoting the functions of the skin by means of baths.

In some cases the products of inflammation cannot be absorbed, and then it may be necessary to have recourse to operations for their removal. In others, what has to be done is to encourage certain acts by which these products are discharged, such as the act of coughing in cases of bronchitis.

3. In the next place the *general condition* of the patient must be attended to:—The various forms of *fever* met with must be treated according to the principles which will be laid down when considering this subject. If the inflammation is of *specific*, *constitutional* character, particular remedies are called for, such as mercury in syphilis or colchicum in gout. In certain other forms of inflammation also, special medicines have been found most useful, such as tincture of iron in erysipelas, chlorate of potash in inflammations about the mouth and throat. *Diet* must be regulated according to circumstances, and it is impossible to lay down any definite rules, so much depending on the part affected, the state of the patient, and other circumstances. Should there be any tendency to depression, nourishing diet and stimulants are called for, often in considerable quantity, and this is especially the case if suppuration, ulceration, or gangrene sets in. *Tonics*, such as quinine, bark, mineral acids,

steel, as well as cod-liver oil, are then also indicated. Of course it is necessary to pay careful attention to all hygienic conditions.

4. Every precaution must be taken against the occurrence of untoward terminations, such as *suppuration*, *ulceration*, or *gangrene*; should either of these set in, however, it must be treated by appropriate measures. The escape of pus must be encouraged or its formation checked; ulceration healed; and the separation of dead parts promoted.

5. It is often necessary to attend to *local symptoms*, these necessarily depending upon the part affected. Among these a prominent one is *pain*. For its relief many of the remedies already considered are very valuable, but the most important drug for this purpose is *opium*. It is exceedingly serviceable in many inflammations in various other ways, such as by inducing sleep, stopping the peristaltic action of muscular tissues, allaying irritability, and probably directly influencing the inflammatory process. It is contra-indicated or must be given with great caution under certain circumstances, viz., if the respiratory organs, kidneys, or brain are involved. *Hydrate of chloral* and other sedatives are also very useful in many cases for the relief of pain and sleeplessness.

Chapter V.

HYPERTROPHY.

This term implies an over-growth, and ought to be strictly limited in its meaning to the "increase in an organ or structure of its normal tissue elements." The tissue may be augmented either from an enlargement of its previously existing constituents, or from the formation of new and additional elements. The latter mode of overgrowth is now termed *numerical hypertrophy* or *hyperplasia*. It must be remembered that an organ is usually made up of several tissues, either of which may be the seat of hypertrophy, and thus its active functions may be improved or the reverse. For instance, as has been pointed out by Dr. Quain, in the heart either the muscular tissue, the fibrous tissue, or the fat may be increased, and each form is a true hypertrophy of a certain kind. In most cases, however, it is the active tissue which is increased, and the functions of an organ are promoted thereby. Muscle is peculiarly prone to become hypertrophied.

Effects.—Increase in weight is the only necessary result of hypertrophy. Usually there is enlargement of an organ and sometimes change in shape, but not always. The walls of hollow organs are generally thickened. The physical characters of the tissue involved may be quite natural as regards colour, consistence, &c., or they may be more or less altered. An organ may at first be the seat of hypertrophy, but afterwards undergo degeneration, as happens not uncommonly in the case of the heart. The symp-firmer, or softer than in their normal condition. Their functions are necessarily impaired.

ETIOLOGY.—1. Anything that interferes with the *proper nutritive qualities of the blood* will give rise to general wasting to a greater or less degree. Hence this may arise from direct loss of blood; deficiency in the quantity or quality of the food; diseases which interfere with digestion and absorption, as well as those which lead to the excessive removal of the nutritive elements of the blood, such as Bright's disease, prolonged suppuration, or phthisis. In cancer there is frequently an extraordinary degree of wasting, involving also the internal organs. In a case of cancer of the lungs which came under my observation the heart only weighed 3¼ ounces.

2. Combined with the foregoing cause, or acting alone, there is often *increased waste of tissue*, which cannot be repaired, as is observed in fevers and many other diseases. In some instances atrophy from this cause is limited to one organ, of which acute atrophy of the liver affords an illustration.

3. The *vitality and nutritive activity* of the tissues generally may be impaired, or only those of some particular part or organ, and thus general or local atrophy may result. This is in many instances the normal course of events, associated with a natural impairment or cessation of functions, as for instance in "senile atrophy," of which it is an important element, as well as in the wasting of organs or structures, such as the thymus gland, spleen, lymphatic glands, which at a certain period of life become atrophied because their functional activity is at an end. The same thing is seen in the rapid diminution in the size of the uterus after delivery. In other instances the impairment of vitality is due to some previous disease, such as inflammation. Excessive use on the one hand, or deficient exercise on the other may produce the same effect. There can be no doubt but that if certain organs are exercised unduly they may waste, *e.g.*, the brain or testicle; while examples of the opposite condition are common enough, in the wasting of the muscles of paralysed limbs, of bone after amputation, or of nerves after their connection with the cerebro-spinal axis has been severed.

4. An important cause of atrophy is a *deficient supply of arterial blood*, in whatever way this may be brought about, whether by something directly interfering with its entrance into a part, or by over-loading of the veins in long-continued mechanical congestion. To some extent this will explain "senile atrophy," the heart and arteries having undergone degeneration and the circulation being thus impeded. It is in the production of "local atrophy," however, that this cause mainly acts, and any structure may be affected if the supply of blood is not adequate to the demand, provided this is not so deficient as to lead to gangrene.

5. *Direct pressure* upon an organ or tissue may occasion atrophy, partly, but not entirely, on account of the interference with the supply of blood thus brought about. The pressure of pericardial thickenings upon the heart occasionally causes atrophy of this organ, but the best illustration of this form of atrophy is that which

follows the continued pressure of aneurisms and other tumours, by which bones and other structures are often extensively destroyed.

6. It has long been known that the *nerves* exercise an important influence over nutrition, and hence when any nerve is paralysed, atrophy is liable to follow in the part which it supplies. This is partly to be attributed to the resulting cessation of functions; partly to the influence exercised on the supply of blood through the vessels; but to some extent to the direct control which nerves exert over the process of nutrition.

7. Certain *medicines*, *e.g.*, mercury, iodide and bromide of potassium, alkalies, &c., when administered for some time have the power of causing the absorption and wasting of particular organs or tissues. This power is made use of in order to promote the removal of morbid products.

8. Some forms of atrophy are met with the cause of which is at present not satisfactorily decided, *e.g.*, progressive muscular atrophy.

CHAPTER VI.

DEGENERATIONS.

STRICTLY speaking a *degeneration* is a *retrograde metamorphosis*, and implies the conversion of some tissue into one less organised than itself, which is incapable of performing satisfactorily its necessary functions. This may result either from an immediate change in the albuminoid compounds; or from a molecular absorption of the structural elements, and their replacement by others lower in the scale. The term, however, is also applied to certain pathological processes in which a new material derived from the blood is deposited in the midst of the original elements of a tissue, which may or may not lead to their absorption, in some instances ultimately replacing them entirely. To these two kinds of so-called degeneration the terms *metamorphosis* and *infiltration* are respectively applied. These pathological changes are of the utmost importance, and they need to be severally considered in some detail.

I. FATTY DEGENERATION.

This includes *fatty metamorphosis* and *fatty infiltration*, each of which requires separate notice.

1. FATTY METAMORPHOSIS.—The fact of the direct conversion of the albuminoid constituents of tissues into fat has been established by observation and experiment, and it is a frequent pathological occurrence, being one of the natural events of decay in old age, and often leading to serious consequences. The process may take place in connection with cells or fibres. The fat is usually deposited in a granular form, but ultimately it may accumulate into masses or into drops of oil. The granules are recognised by their

dark and distinct outline, refractive power upon light, and solubility in ether. Fatty metamorphosis will be best studied by taking individual tissues as illustrations.

Muscular Tissue.—Voluntary muscles may become the seat of fatty change, of which a striking example has come under my notice, in which almost the whole of the muscles of the thigh on one side were converted into fat, without any alteration in their general size or shape or in the arrangement of their fibres. The subject, an old woman, had been bed-ridden for several years. It is in the fibres of the heart, however, that this degeneration is most commonly observed. Under the microscope these are seen in the early stage to be somewhat dim as regards their transverse striæ, owing to the presence of a few minute fat granules, arranged either in transverse or longitudinal lines, or in an irregular manner. Ether dissolves the fat and brings the striæ into view again. The increase in the number and size of the granules causes them to become more and more obscure, until eventually all trace of muscular fibre disappears, and its place is occupied by fat molecules and oil drops. Where sarcolemma exists, this may ultimately rupture and the fat be scattered about. The cells of involuntary muscular tissue are also liable to undergo fatty change, granules gradually filling them up and concealing the nucleus, complete destruction finally ensuing. The conversion of muscle into adipocere after death is a form of fatty degeneration.

Blood-vessels.—The arteries are very prone to fatty degeneration as age advances, which may start as an immediate change in the cells of the inner coat or in the muscular coat, or be associated with the condition named "atheroma." At last the tissues may be more or less destroyed and carried away by the blood-current, leaving uneven erosions on the inner surface of the vessels. The capillaries are also apt to undergo a fatty change.

The *nerve-tissues*, both cells and fibres, are subject to fatty degeneration, becoming the seat of much molecular fat and finally breaking down. This is well seen in the different varieties of softening of the brain or spinal cord.

As regards fatty degeneration in cells, the following may be mentioned in further illustration. The so-called "compound inflammatory globules" or "exudation-corpuscles," as well as pus-corpuscles are merely the result of the conversion of the contents of cells, either normal to the part or which have migrated from the blood, into granular fat. A large number of these originate in cellular tissue corpuscles. In the epithelium of the renal tubes, as well as the cells of the liver, suprarenal capsules, and lymphatic glands, fatty degeneration also occurs, while the "arcus senilis" is due to the same process in the cells of the cornea. Most organs in their natural decay undergo this change, and it is further exemplified in the formation of many secretions, in the production of the corpus luteum in the ovary, and in the degenerative changes which the placenta undergoes on the approach of the full period of pregnancy. Morbid growths, such as cancer, tubercle, and various tumours, are likewise subject to fatty metamorphosis.

When cells become fatty they often enlarge and are more spherical and distended. The granules first appear at a distance from the nucleus, scattered irregularly; they then become more numerous and larger, obscure the nucleus, and finally render it quite invisible. The cell-wall is often ruptured or absorbed, leaving merely an accumulation of granular fat, which frequently separates into its constituent particles, owing to intermediate liquefaction.

Caseation, Caseous or Cheesy Degeneration.—These terms have come into considerable prominence of late years, and are used to signify the conversion of various structures into a kind of soft, dryish, cheesy-looking substance, of yellowish-colour. It is really a process of partial fatty degeneration with drying, and the material formed is found to consist of withered cells, fat granules, partially saponified fat, and crystals of cholesterine. Caseation generally occurs in connection with some morbid product, or where there is a great accumulation of cells pressing closely upon each other, and it is especially met with where vessels are few, so that the tissue is dry. Pulmonary phthisis affords some of the most frequent examples of caseous degeneration, but not of necessity associated with tubercle. It is also often seen in scrofulous lymphatic glands, cancer, chronic abscesses, &c. Ultimately a more or less creamy or puriform-looking fluid substance may be produced, or a kind of fatty emulsion, which may be completely removed in various ways; or it may become encapsuled by some dense tissue and finally calcify. By some pathologists this caseous material is supposed to act as a poison, and after absorption into the blood to originate tubercle.

EFFECTS.—The changes induced by fatty degeneration are usually quite obvious if it is at all marked, but in less advanced cases the microscope can alone reveal the change. There is an alteration in colour, the affected tissue becoming usually paler and assuming a yellowish or brownish tint; this is well seen in muscular tissue, but in some instances, as in softening of the brain, the colour varies from white to red according to circumstances. A tendency to opacity is also evident. One of the most marked changes is a diminution in the consistence of the affected structure, which varies from a slight degree of softening, the tissue breaking down under pressure or tearing more easily than in health, to its conversion into almost a fluid pulp. All vital properties, such as elasticity or contractility, are at the same time impaired or lost, as well as the power of resistance. When the process is advanced, the affected tissues may have an oily feel, and ether will dissolve out a considerable quantity of fat.

The remote consequences are very important. The functions of any organ or tissue involved must necessarily be interfered with to a greater or less degree. Structures are also very liable to give way and rupture, as in the case of the heart and vessels. Arteries may become the seat of aneurism, and by interfering with the supply of blood to structures which depend on them for their nutrition, ultimately lead to their degeneration also.

ETIOLOGY.—Some interference with nutrition is the immediate cause of fatty degeneration, and it may occur under either of the conditions mentioned as capable of giving rise to atrophy. Those to which it is usually due are—1. Senile decay, during which most of the tissues undergo degeneration. 2. Deficient supply of arterial blood to a part, from obstruction, changes in the vessels, or external pressure. 3. Some general disease lowering vitality, such as phthisis or cancer. 4. Congestion, inflammation, very rapid development of a tissue, or excessive exercise of its functions, which disturbs its vitality. 5. Possibly the presence of an excess of fat in the blood may occasion fatty decay.

2. Fatty Infiltration or Growth.—This is an essentially distinct process from "fatty degeneration," there being no necessary change in the elementary structures themselves, but merely an excessive deposit of fat from the blood within the cells of the part affected, and this infiltrates the tissues to a variable extent. It might, in fact, be considered a *hypertrophy* of fat. The deposit occurs in the form of oil-drops, which ultimately run together, completely obscuring the other contents of the cells without of necessity destroying them. In course of time the tissues may degenerate from mere pressure and be finally absorbed. The best examples of this infiltration are found in the increase of ordinary adipose tissue observed in some individuals, subcutaneous as well as around internal organs; in connection with the heart; and in the cells of the liver. In the two former instances the connective tissue cells become filled with fat. In the liver the hepatic cells become more or less loaded with drops of oil, which cause them to become larger and more spherical and hide their contents.

Effects.—Fatty infiltration may occasion enlargement of organs and some alteration in form, there being a tendency to roundness of margins and general outline. The colour also becomes paler and may be just that of adipose tissue. The principal changes observed are that the affected structure is softened, and has a doughy feel, such as is met with in ordinary fat; and evidences of the presence of more or less oil may be obtained, either by the finger, the knife, blotting paper, or ether. The functions of the tissues involved are often interfered with, but not to the same extent as in fatty degeneration, provided they have not undergone this process owing to pressure.

Etiology.—1. *Excess of fat in the blood* is a common cause of this pathological change, which is often associated with obesity. This results from consumption of too much fat or of aliments which contribute to its formation; from a deficiency in the amount of exercise taken, and general luxurious habits; or from both these causes combined. There is also a diminution in the ordinary waste of fat under these circumstances.

2. In some affections attended with much emaciation, certain organs are prone to become the seat of fatty infiltration, especially the liver. This is best seen in phthisis, and is supposed to be due to the absorption of the general fat and its consequent accumulation in the blood, from which it is afterwards deposited in the liver.

3. Undoubtedly *interference with the respiratory process* may lead to

filtration, because the fat is then not properly burnt up, and s not infrequent occurrence in lung and heart affections will ly accounted for.

ocal inactivity may be the cause of fatty infiltration. Thus it e observed in connection with voluntary muscles which are sed or otherwise rendered inactive.

MINERAL OR CALCAREOUS DEGENERATION.—CALCIFICATION.—PETRIFACTION.

important to distinguish this degeneration from true ossifica- ith which it is often confounded. There is no conversion one, but merely an infiltration of the tissue involved with es of calcareous matter. These are in the form of very molecules, chiefly deposited irregularly between the histo- elements, but partly in their interior as well. Under the cope they look like dark, opaque, irregular particles under itted light, and when aggregated have a glistening aspect. often resemble fat in appearance, but may be distinguished ir solubility in dilute mineral acids, which is frequently at- with effervescence and the formation of small bubbles of wing to the decomposition of carbonates. The deposit first immediately around small vessels where these exist, imately it may increase so as to form irregular patches or tions of considerable extent. Chemically it is made up of calcic and magnesic phosphates and carbonates, but alts are also present, and the composition is not uniform in ctures.

ification is particularly prone to occur in tissues which ost their vitality, and which have previously undergone orms of degeneration, especially the fatty. It is in fact ommonly the final stage of degenerative change, after which her alteration can take place. Among its most frequent ire the *arteries* and the *valves* and *orifices of the heart*, and it is nection with these structures that its most injurious effects oduced. Calcareous deposit, however, is met with in many issues, viz., in fibrous or fibro-serous membranes, *e.g.*, the dium, dura mater, tunica albuginea, &c.; in the walls of organs, such as the gall-bladder or stomach; in the pia and choroid plexuses of the brain, constituting "brain- in cartilage, muscle and nerve tissues; in various organs ands, such as the kidneys, lungs, absorbent glands, thyroid, e, and pineal gland; in connection with different morbid ts, as tubercle, cancer, inflammatory exudations, fibrinous s from the blood, chronic abscesses, and tumours of all

CTS.—The deposit of calcareous matter necessarily occasions ss, stiffness, roughness, and rigidity, often combined with ness. There is a gritty sensation on section, and when anes are involved they can frequently be broken up with a crackling noise. In some cases stony masses of some size are formed. Now and then a kind of chalky fluid is produced, or a substance like cement. The most injurious consequences result from the change in size and shape of structures; the roughness and interference with free movement and with the functions of elasticity and contractility; and the brittleness which attend calcification. Thus in the case of arteries, it narrows their calibre, makes them rough and rigid, destroys their elastic and muscular tissues, and renders them liable to be easily ruptured. Hence it leads to insufficient supply of blood to parts, with consequent atrophy or gangrene; also to the formation of internal clots, or to hæmorrhage. In connection with the valves and orifices of the heart it causes serious obstruction and interference with their normal functions. In some cases, however, calcification is distinctly a favourable result and indicates the cessation of injurious morbid processes. It is, in fact, in such instances, a practical cure, and the calcified substance may remain for many years inert, without causing any disturbance. This is well seen in connection with phthisical deposits and scrofulous lymphatic glands. A case fell under my notice some years ago, where in a highly scrofulous young man, aged 21, the whole of the glands in the abdomen were converted into calcareous masses, and had evidently been in this condition for many years without leading to any inconvenience, the patient dying from quite an independent acute illness.

Etiology.—1. Calcification is usually associated with *deficient vitality* and *a lowering of the nutritive activity*, either general, such as occurs in advanced age; or local, such as is met with in connection with morbid products, being then dependent upon an insufficient supply of blood, with slowness of its circulation. As already stated, it is frequently the termination of other atrophic and degenerative processes. With regard to the immediate cause of the deposit, it is supposed to be due partly to the inability of the tissues to take up the nutritive fluid in which the salts are dissolved; partly to the precipitation of these, because the carbonic acid which holds them in solution escapes, owing to the stagnation of the fluid.

2. Occasionally calcification is dependent upon *the presence of an excess of calcareous salts in the blood.* This may arise in connection with diseases of bones, such as mollities ossium, extensive caries or necrosis, in which their salts are rapidly absorbed, and "metastatic deposits" are afterwards formed in other parts, involving often many structures and organs. An interference with the urinary secretion may also lead to this condition, the salts not being properly eliminated, and when this happens the kidneys are particularly apt to be the seat of deposit.

III. Fibroid Degeneration.

Tissues are sometimes gradually changed into a tough, inelastic material, made up of imperfect fibres resembling those of fibrous tissue. There is no apparent exudation to any extent, but a hyperplasia of the cellular-tissue elements occurs. The affected part is more or less opaque, whitish, thickened, and stiff, sometimes being hard and rough. The fibro-serous and serous membranes often present this change in the form of thickened patches, which are well seen in connection with the pericardium. It also affects other structures, such as the coverings of organs, as that of the spleen or liver; the sheaths of vessels; the valves, tendinous cords, and muscular tissue of the heart. The functions of the involved parts may be much impaired. Ultimately they may become calcified. This fibroid degeneration results from pressure and friction; from repeated traction; or sometimes from long-continued congestion. It is not always easy to draw a line between the effects of this process and those of chronic inflammation, and some pathologists consider that the latter always precedes and is the cause of the fibroid change.

IV. Pigmentary Degeneration. Pigmentation.

General or local changes of colour in tissues may result from various causes. As illustrations may be mentioned the colour due to jaundice or local staining by bile; the bronzed hue accompanying suprarenal disease; the colour produced by the action of the intestinal gases or of those set free in mortifying parts; and that brought out by the prolonged administration of nitrate of silver. What is at present under consideration, however, is the deposit of actual pigment in connection with various textures; and it is necessary to discuss the origin, nature, and characters of the different kinds which may be met with.

1. In the great majority of cases in which pigment is found, it originates from the colouring matter of the blood, which undergoes certain changes. This colouring matter may be present in some localised part, either from its mere transudation through the coats of the vessels; from the migration of red corpuscles; from actual hæmorrhage having taken place; or from capillary stagnation. At first it is diffused and stains the tissues, especially the cells, colouring their contents but leaving the nucleus and envelope unaffected. After a while the colour changes, assuming a variety of tints, such as yellow, yellowish-brown, brown, reddish-brown, dark-brown, grey, or black; the exact hue depends much upon the length of time the pigment has been formed, and the tissue in which it is present. At the same time it separates into minute molecules or crystals or both, which are found within or outside the cells. The molecules may aggregate into large granules; they are round or irregular in shape, well defined, opaque or sometimes glistening in appearance. The crystals are in the form of minute oblique prisms, needles, or plates, which vary in colour from yellow, through red or brown, to black, and they present a shining aspect. These particles are very persistent, they resist the action of acids and are not easily destroyed. Water, alcohol, and ether do not affect them, but they are dis-

solved by strong alkalies, forming a red solution, while concentrated mineral acids bring out a series of changes of colour. Chemically the pigment is supposed to consist of *hæmatoidine*, but when it becomes black it is named *melanin*. Examples of these changes in blood-pigments are frequently met with in connection with cerebral apoplexy; in pulmonary congestion or hæmorrhage; in subcutaneous extravasations; and in the formation of the "corpus luteum" in the ovary. The alterations in the colour of the "rusty expectoration" of pneumonia as the disease progresses are due to the same cause. In certain affections the blood itself contains corpuscles enclosing a quantity of black pigment. This occurs in the rare disease called *melanæmia*, as well as after prolonged attacks of ague, in which the spleen becomes enlarged and contains an abundance of the same pigment, which is supposed to be absorbed into the blood. It is, however, originally derived from the blood-pigment. The same condition is observed in melanotic tumours. Occasionally the minute portal vessels of the liver become filled with black pigment.

In some instances pigment is supposed to be directly formed and secreted in certain cells, but here again the blood must be looked upon as its ultimate source. This is especially presumed to occur in growths connected with tissues which normally contain much pigment, such as the choroid coat of the eye.

2. An important source of pigmentation in connection with the lungs and bronchial glands is the inhalation of certain substances along with the air breathed. All persons are liable to inhale small particles of carbon, the product of imperfect combustion, and this occurs especially in large towns and manufacturing districts. Hence it is found that the lungs become darker as age advances. It is, however, in the lungs of those who owing to their occupation are exposed to the constant breathing of air containing various minute particles suspended in it, that the most marked alterations are observed. Colliers inhale fragments of coal and their lungs become ultimately perfectly black. Miners, stonemasons, and others are also subject to changes in the colour of these organs from a similar cause.

The carbon or coal exists in the form of minute granules which resist all chemical change, and these after entering the small bronchi and air-cells somehow penetrate the tissues, passing into the epithelium-cells, as well as into the tissue between the lobules and around the bronchi, where they lie either free or enclosed in the connective tissue corpuscles. They are taken up by the lymphatics and conveyed to the bronchial glands, which soon become quite black also. In the matter which is expectorated abundant pigment is seen within the cells which it contains, and the sputa may be perfectly black. The change of colour in these cases is, however, not believed to be entirely due to the direct deposit of material from without, but partly to the irritation caused by this material setting up inflammation, with stagnation of blood, the pigment of which undergoes the usual alterations.

V. MUCOID DEGENERATION.

Some tissues occasionally undergo a process of softening or liquefaction, to which this term is applied. They become changed into a mucilaginous substance, colourless and homogeneous, which yields *mucin*. In fact they seem to return to their original fœtal condition. The change may take place extensively or in limited spots, in which, being surrounded by healthy tissue, it may give rise to an appearance of cysts. The intercellular tissue is most affected, but sometimes the cellular elements become involved in the degeneration. This degeneration is met with in cartilage, bone, serous membranes, and in the choroid plexuses of the brain. Some tumours are of a "mucoid" structure when first formed, and many others may undergo this change more or less.

VI. COLLOID DEGENERATION.

The substance formed in this change is of a jelly- or glue-like consistence, glistening, transparent, and devoid of colour. It is derived from the albuminoid tissues, and differs from *mucin* in that it has sulphur entering into its composition, and in not being precipitated by acetic acid. This degeneration also involves the *contents of the cells* themselves and not the *intercellular substance.*

Ultimately the colloid substance may form considerable masses from coalescence, which often appear to be contained in cystic cavities. New growths sometimes start as "colloid tumours," and other tumours are liable to the change. Formerly all "colloid tumours" were looked upon as being of a cancerous nature, but it is now recognised that non-malignant tumours may become the seat of this degeneration. Enlarged thyroid glands and lymphatic glands occasionally contain colloid material.

VII. LARDACEOUS DISEASE.—ALBUMINOID INFILTRATION.—AMYLOID DEGENERATION.—WAXY DISEASE.

By these names among others a very important morbid condition of organs and tissues has of late years been recognised. There is yet much uncertainty about several points connected with it, but the following account may convey tolerably complete information as to the present state of knowledge on the subject.

1. CHARACTERS OF THE ALBUMINOID MATERIAL AND OBJECTIVE CHANGES IN THE TISSUES AFFECTED.—The material, the presence of which in certain tissues is characteristic of albuminoid disease, is pale, structureless and homogeneous, and at first nearly transparent. It is not prone to decomposition, is unaffected by most reagents, but gives certain characteristic chemical reactions. When a watery solution of iodine is applied to the affected tissue a deep reddish-brown or mahogany colour is brought out, but this is not invariable even when the disease is advanced, and it may be more

useful as indicating a slight degree of the change, especially when applied to microscopic sections. The subsequent addition of a drop of strong sulphuric acid may give rise to a violet or dark-blue colour, but this test, which is recommended by Virchow, is not easily obtained and is unnecessary. The morbid substance may undergo a granular or fatty degeneration, and it is also said that it tends to contract and be changed into fibrous tissue. When an organ or tissue is much affected it presents certain striking characters. The organ is enlarged, sometimes to a great degree, but without any irregularity in form, the surface being quite smooth and the margins inclined to be rounded; the weight is proportionately increased, the specific gravity is high, and the organ feels heavy, solid, and firm. It may be cut into regular fragments, quite smooth and with sharp margins, or very thin slices may easily be removed. It can also be torn into pieces, while the consistence is peculiar, being a combination of toughness and resistance with elasticity, resembling somewhat that of wax or wax and lard combined—hence the names "waxy" and "lardaceous." A section is dryish, paler than normal, anæmic, and presents a glistening and translucent aspect, being quite smooth, uniform, homogeneous and compact. In many instances, however, the mischief has not extended to such a degree as to alter much the general physical characters of organs; and it may be limited to the vessels or to certain spots, as is well seen in the so-called "sago-spleen," in which the material is confined to the malpighian corpuscles. In still less advanced cases the change may only be detected by examining sections of the affected tissue under the microscope, and to these, well-washed, the iodine test may be applied. The minute arteries and capillaries are almost always first involved, especially their muscular coat, and the cells of their inner coat. The walls become thickened, the channel is narrowed, and on section the vessels remain patent, while they assume a compact, translucent, shining appearance, coming to resemble silvery cords or threads. After a time the material extends to the cells and intercellular tissues, enlarging the former and making them more spherical, at the same time displacing their normal contents, the nucleus being destroyed. The cells then coalesce; and the whole structure presents finally the peculiar glistening appearance. It is supposed by some that the substance makes its way directly through the walls of the vessels and then extends into the tissues around.

2. NATURE AND ORIGIN OF THE MORBID MATERIAL. — Various theories have been held on these points. Virchow, on account of its chemical reactions, considered the substance to be allied to starch or cellulose—hence the term "amyloid"; others believed it to be a form of cholesterine. These views have, however, been entirely disproved, and that at present commonly adopted is, that the material is of an *albuminoid* nature, being allied to albumen and other protein elements. The results of chemical analysis show that it is a nitrogenous compound. Dr. Dickenson affirms that organs in which it exists are deficient in alkaline salts, and has advanced the view that the substance is *de-alkalized fibrin.* Marcet

found that the affected structures were deficient in potash and phosphoric acid, but contained excess of soda and chlorine. With regard to the *origin* of the albuminoid material, two distinct theories are held, viz., that it is the product of some *local degeneration* or *metamorphosis* of albuminous tissues; or that there is a *direct deposit* from the blood, in consequence of some alteration in this fluid, which deposit infiltrates the tissues. Nothing of the nature of this albuminoid substance has, however, been detected in the blood, and therefore the presumption is that it is modified after it escapes from the vessels. Dickenson thinks that the fibrin of the blood is deprived of its alkali, as the result of prolonged suppuration, and that it is then deposited. Dr. Grainger Stewart strongly advocates the degeneration theory, and calls attention to the distinction between the waxy degeneration proper, and the secondary deposit of fibrinous material which results from it.

3. ORGANS AND TISSUES AFFECTED.—Albuminoid disease is particularly liable to affect small arteries and capillaries, cells, and involuntary muscular fibres. Any organ or tissue in the body may be implicated and usually several organs are involved at the same time. The liver, spleen, kidneys, and absorbent glands are most frequently affected, but other structures are also attacked sometimes, such as the stomach and intestines, supra-renal capsules, bones, voluntary muscles, brain and cord and their membranes, tonsils, serous membranes, heart, lungs, pancreas, uterus, and bladder, morbid deposits, *e.g.*, inflammatory exudations, tubercle, or cancer, may also present the albuminoid change. In some cases when it follows disease of bones it begins in the neighbouring lymphatic glands, and this is considered as an argument in favour of its local degenerative origin. In many of the organs above mentioned the disease seems limited to the minute vessels.

4. ETIOLOGY.—This affection is almost invariably brought on by some previous disease, which in the great majority of cases is attended with *long-continued and excessive suppuration*, but the experience of many observers has proved that this is certainly not absolutely necessary, and in the worst case which ever came under my notice there had been no suppuration. The diseases with which albuminoid disease is chiefly associated are—*a*. Caries or necrosis of bones and rickets. *b*. Syphilis, especially if it has caused disease of bones with much suppuration, or if much mercury has been given. Children who are congenitally syphilitic may be the subjects of albuminoid disease. *c*. Chronic pulmonary phthisis with much purulent expectoration, as well as other lung affections attended with this symptom. *d*. Chronic empyæma. *e*. Extensive ulceration of the intestines. *f*. Prolonged ague or exposure to malarial influence. *g*. Pyelitis and some other kidney affections.

5. CLINICAL HISTORY.—Only a few general remarks need be made here, as the symptoms will again be described in connection with individual organs. It is not always easy to make out what symptoms are due to the original affection, and what to the albuminoid disease. Nutrition is impaired and the patient is emaciated, often extremely so, at the same time becoming pale and anæmic,

with a peculiar transparency of tissues, or presenting a waxy look. There is great debility in many cases, with a tendency to syncope. Œdema of the legs occurs from weakness and anæmia. With regard to the various organs, their functions are interfered with more or less, and local symptoms are produced, while some of them are frequently obviously enlarged and present well-defined characters to physical examination.

6. Treatment.—This must be directed to the cause of the disease, by putting a stop to suppuration &c.; at the same time that the general health is improved by *diet*, *hygienic measures*, *tonics*, *iron*, and other remedies indicated in different cases. The administration of the syrup of iodide of iron is certainly often attended with considerable benefit, if persevered in for some time.

SECTION III.

ainder of this work is chiefly devoted to the consideration dual diseases. Much controversy has been carried on ard to the NOMENCLATURE and CLASSIFICATION of diseases, y systems have been proposed. The arrangement adopted ollowing chapters will be mainly on the model of that re- l by the College of Physicians, most of the complaints escribed according as they come under one of the groups d below, though it will be expedient to deviate from this ment in some instances.

ERAL DISEASES.—These affect more or less the entire sys- l though local morbid conditions are often present, they condarily, as the necessary or accidental consequence of ral disorder. Under this class are included :—

The various *idiopathic fevers* and certain other affections re due to the action of a specific poison on the system in- l from without. *Ex.* Scarlatina, small-pox, ague, &c.

onstitutional Diseases.—These are dependent upon some un- condition of the blood or so-called *cachexia*, which, how- usually revealed by local lesions, often developed in several the body at the same time or in succession. Many of ginate from the action of a morbid poison, either entering thout, or more commonly generated within the system, or down by hereditary transmission. In some of these dis- such morbific agent can be detected. *Ex.* Rheumatism, scurvy, &c.

CAL DISEASES.—Under this group will be described the affections of the different organs and tissues in succession. be convenient to treat under this heading not only of *local* disorders, but also of some complaints which are ictly of a *general* character, but which present special local tations.

I. GENERAL DISEASES.

A. IDIOPATHIC FEVERS.

ACUTE SPECIFIC FEVERS. ACUTE EXANTHEMATA.

proceeding to discuss the several diseases included under e group, it will be expedient in the present connexion to the following subjects, viz. Fever; Contagion; and Epi-

CHAPTER I.

FEVER OR PYREXIA.

THE phenomena of *fever* may be observed in connection with two distinct classes of cases, viz.:—First, they may follow and be the result of some local lesion in a tissue or organ, especially inflammation, when the fever is termed *secondary*, *symptomatic*, or merely *pyrexia*, *fever*, or the *pyrexial state*. The fever attending pneumonia will serve to illustrate this group. Secondly, they may constitute the chief and primary deviation from the normal state, not being due to any evident local cause, and if any special organ or tissue becomes morbidly affected, this occurs secondarily. *Idiopathic*, *essential*, *primary*, or *specific* are the terms applied to fever under these circumstances, or it is simply called *a fever*. It originates from the presence of some morbid poison in the blood, either introduced from without or developed within the body. The acute specifics and rheumatic fever afford examples of this class.

ESSENTIAL PHENOMENA AND SYMPTOMS. The precise symptoms which may be observed in different febrile diseases are necessarily very variable, but there are certain phenomena which are characteristic of the pyrexial condition, to whatever cause this may be due, and to these attention will now be directed. They may be arranged thus:—

1. *Rise in Temperature.*—This has been generally looked upon as the only absolutely necessary sign of fever, excessive heat of the body being considered as characteristic of the febrile state. It may be evident in the aspect or sensations of the patient, or the skin may feel hot to the touch; but no reliance can be placed on these sources of information, and the existence of pyrexia must be determined by the use of the thermometer. The temperature may range from only just above the normal to 108°, 110°, or even above 112° Fahr., but it does not commonly exceed 105° or 106°. It may continue to rise for some time after death.

2. *Alterations in the Secretions.*—Pyrexia is attended with *deficient elimination of water* from the system, and at the same time with excessive destruction of tissues. Hence the secretions and excretions are as a rule *diminished in quantity*, as well as *altered in quality*, and from this result some prominent symptoms, viz.:—*a. Dryness and roughness* of the skin, though this is not always observed, in some cases there being profuse perspiration. *b. Derangements of the alimentary canal.* The salivary, gastric, and intestinal secretions are deficient; hence the tongue is furred and the mouth clammy; there is much thirst, but no inclination for food, and the bowels are constipated. Nausea and vomiting are not unfrequent symptoms. *c. Changes in the urine.* This is much diminished in quantity, high-coloured, very acid, with a strong odour, and of high specific

associated with fever; the next point to consider is how it may terminate, supposing recovery to take place, or, in other words, how *defervescence* may be brought about? The *modes of termination* are:—1. *By Crisis.*—This mode is characterised by a sudden or rapid abatement of the fever, indicated by a marked fall in temperature, which may become normal in a few hours; at the same time there is generally a considerable increase in the various excretions, indicated by copious perspiration, a free flow of urine containing a large amount of solid ingredients, or watery diarrhœa. In some cases hæmorrhage occurs, such as epistaxis. 2. *By Lysis.*—Here there is a gradual defervescence, the temperature subsiding slowly and regularly for some days, and there being no critical discharges. 3. *By a combination of crisis and lysis.*—At first a rapid fall occurs to a certain degree, this being followed by a gradual lowering of temperature; or for some days a regular alternation of high and low temperature is observed. 4. *Irregular.*—Occasionally defervescence is quite irregular in its progress. During convalescence the temperature and amount of excretions often fall below the standard.

TYPES OF FEVER.—The symptoms described as belonging to fever are very variously combined, and present a wide range as regards their severity and course. Hence certain types are recognised.

1. *Types depending upon the course and mode of progress of the symptoms.—a. Continued.*—This group comprehends all fevers which run a tolerably regular course, without any very marked difference in temperature at different periods of the day. It includes the acute specific fevers (small-pox, scarlatina, &c.), and most cases of inflammatory fever. In these the temperature rises more or less rapidly up to a certain point, then remains tolerably stationary for a time, and finally defervescence occurs in one of the ways already mentioned. *b. Remittent.*—Here there are marked remissions in the fever alternating with exacerbations, as indicated by the temperature and other symptoms. This variety is met with chiefly in tropical climates, but remission is also an important character of *hectic* fever. *c. Intermittent.*—This type is characterised by complete cessation of all febrile symptoms, which only come on at certain regular intervals and run through a definite course, the temperature in the meanwhile being quite normal. The different forms of ague afford examples. *d. Relapsing.*—In some forms of fever, after an attack of the *continued* type defervescence and apparent recovery take place, but this is followed after some days by a *relapse*, which event may occur more than once.

2. *Types depending upon the severity and combination of symptoms.— a. Simple.*—This form is the simplest expression of fever, presenting the characters already described, but in a mild degree. It is well exemplified in ordinary *febricula.*

b. Inflammatory.—As the term suggests, this type is the one which is usually associated with local acute inflammations, at all events at the outset. It does not, however, necessarily accompany every inflammation, nor does the fever always bear a proportion to the tions usually once in the twenty-four hours, occasionally twice. The fever sets in very gradually, at first only a slight evening rise in temperature being noticed, with quickening of the pulse; after a while it becomes more or less constant, but a marked increase takes place towards evening, beginning with chilliness or rigors, followed by much heat of skin, which increases up to or beyond midnight, and is succeeded by profuse sweats, so that the patient's clothes and the bed-clothes become saturated. The subjective feeling of heat is very considerable, and the palms of the hands and soles of the feet have a burning sensation. The appearance of the patient is often very characteristic and striking, there being a beautiful circumscribed bright red or pink spot on each cheek, well known as the *hectic flush*. The pulse is very easily excited and made quicker; during the paroxysms it may rise to 120 or more. It varies in its characters, but is generally jerky, moderately soft, and compressible. The respirations are hurried. This fever is attended with rapid and great emaciation, and the patient feels much exhausted after each attack, becoming ultimately exceedingly feeble. The mind is unaffected until near the close of life, being often, in fact, peculiarly lively and brilliant. The duration of this variety of fever is very variable, but it tends to be prolonged.

PATHOLOGY.—The pathology of the febrile state is still a matter of much doubt and uncertainty, notwithstanding the amount of experimental investigation which has been devoted to the subject. Very conflicting views are held as to its *origin* and *nature*, and as to the explanation of the phenomena by which it is characterised. It seems clear that the condition may be set up by some morbid poison which has gained an entrance into, or been generated within the system; on in connection with some local lesion, especially of an inflammatory nature. Dr. Burdon Sanderson found in his experiments that by injecting certain fluids—which he terms "pyrogenic"—in very small quantity into the circulation, fever could be excited, and these fluids either contained bacteria or the material out of which bacteria are developed. The view most commonly adopted, and probably the correct one, is, that at any rate the commencement of the febrile process results from some disturbance in connection with the nervous system, either directly induced by the morbid poison alluded to above, whatever it may be, or reflexly through irritation of the sensory nerves belonging to an inflamed part. It is believed that the sympathetic and pneumogastric nerves are particularly affected, which leads to increased cardiac action, and general vaso-motor disorder with consequent paralysis of the vessels. Some pathologists do not agree with the idea of any direct implication of the nervous system in fever, but maintain that the cause which originates this condition acts immediately upon the blood and tissues. Even in inflammation they consider that the local contamination of the blood affects the whole mass, and thus gives rise to fever.

There can be no doubt but that when pyrexia has been set up, it is attended with *destruction of tissues* in excess of what normally takes place. In health the structures of the body do not undergo

ly in young and healthy persons. This is particularly seen
spleen, lymphatic glands, and liver, their cells also becoming
;ed and granular.

: substances into which the tissues are transformed are chiefly
produced in health, only formed now in excess, viz., urea,
cid, carbonic acid, &c. Intermediate products of decomposi-
nay, however, be formed, some of which probably are quite
n to the body in a state of health. As to the place where the
e occurs there is no certainty, Some consider that it is in
ssues themselves; others that the albuminous elements break
into a circulating albumen, which in the blood becomes con-
l into materials of lower grade, such as urea, &c.

: chemical and vital changes in the tissues and blood just
bed, have been usually recognised as chiefly accounting for
of the more prominent phenomena which accompany the
: state. Beginning with the *rise in temperature*, it is well
ı that such destructive processes must be attended with the
pment of heat; while it has also been found that as a rule
mperature in cases of fever is in proportion to the rapidity
xtent of these changes, especially as evidenced by the amount
products of tissue-metamorphosis eliminated in the various
ions. In most cases *excessive excretory elimination* is observed,
ularly by the urine, the quantity of urea discharged often
ıg a close relation to the increase in temperature; but this is
ways the case, so that the one cannot be made a measure of
her. In some instances there is little or no increased elimin-
during the progress of the fever. This is explained by the
ion of the products of metamorphosis in the blood, owing
to their great abundance or to their transformation being
plete, substances being produced which the kidneys will not

The view just considered, which attributes the phenomena of fever mainly to the excessive destruction of tissues, has of late been much questioned: and, as the result of experiments on the effects upon the animal heat of making different sections of the spinal cord, as well as of observations as to what happens in cases of injury to various parts of the nerve-centres, and in certain nervous diseases, it has been attempted to be shown that the rise in temperature in pyrexia is directly connected with the nervous system in some way or other. There are conflicting statements about the effects of section of the spinal cord upon the heat of the body, and also as to what has been observed in cases of injury, some of which it is difficult to explain, but there can be no doubt that often the temperature is very much raised. A most remarkable case was recently brought before the Clinical Society by Mr. Teale of Scarborough, in which, in connection with some injury about the upper part of the spine, the temperature ranged for nine weeks between 108° to above 122° F., probably on one occasion reaching at least 125°, the patient ultimately recovering.

With regard to the modes in which the nervous system is supposed to influence the temperature, the main theories are these:—The hypothesis has been advanced that there is a centre in the brain which regulates the production of heat, and that when this is excluded from performing its functions, the development of heat is augmented. For such a view, however, there is no adequate foundation. The other and more reasonable notion is, that the elevation of temperature is the result of vaso-motor disturbance. Most observers believe that the vaso-motor system is paralysed, and that hence the vessels become dilated and an undue amount of heat is lost from the surface of the body. Senator has, on the other hand, tried to prove that there is increased irritability of the vaso-motor nerves in fevers, particularly of those supplying the arteries of the skin, and therefore the vessels contract, thus interfering with the loss of heat necessary to maintain a normal temperature.

It seems clear that the nervous system does influence the temperature of the body considerably, but in cases which are ordinarily recognised as febrile, there is still every reason to conclude that the increased heat is to be accounted for by the exaggerated tissue metamorphosis, and this is the opinion arrived at by a recent observer (Murri) as the result of his experiments. Those cases of injury or disease of the nervous centres in which the temperature is raised, appear to be of a different character. As a subsidiary cause of the increased temperature in fever, it must be remembered that the amount of perspiration partly regulates the animal heat, and this being usually more or less checked, the temperature becomes elevated.

The views of Dr. Beale on this subject deserve notice. He believes that there is a great increase in the bioplasm of the blood, blood-vessels, and tissues, and that this is the cause of the excessive heat. He further states that *insufficient oxidation* of tissues occurs, as a result of which the blood becomes loaded with noxious materials which the excretory organs cannot remove, and this condition of the blood is favourable to the growth of the bioplasm.

As already stated, the low nervous symptoms observed in certain febrile cases have been attributed mainly to non-elimination of the noxious materials resulting from destruction of tissues, and their consequent accumulation in the blood. They have, however, been also referred to the direct action of some fever poison upon the nerve-centres; to excessive heat of the blood, though this seems negatived by Mr. Teale's case; and to plugging of the minute vessels of the grey matter with white corpuscles or septic emboli.

With respect to the circulatory system, in the early stage the heart is excited, but as the febrile process advances it becomes greatly impaired in its action, for several reasons. The muscular fibres themselves undergo degeneration; the organ is supplied with impure blood; and its nervous stimulus is imperfect. As a result the alterations in the cardiac impulse and sounds and in the pulse are observed, as well as the tendency to hypostatic congestions, these being also directly contributed to probably by the abnormal condition of the vessels, tissues, and blood, and by the excessive growth of bioplasm, which tends to block up the capillaries.

Such are the main points in connection with the pathology of fever. There is no adequate explanation of another phenomenon observed, viz., *the retention of water in the system.* It has been supposed that some material forms in the blood, such as gelatine, which has a strong affinity for water, but there is no proof of this.

PROGNOSIS.—The prognosis of febrile cases must necessarily depend greatly on what the fever is due to, and will vary with each particular disease. So far as the pyrexia itself is concerned, however, there are certain conditions which always influence the gravity of the prognosis, viz.:—1. *Its intensity.*—The higher the temperature the more dangerous is the case, and it becomes very serious when the temperature reaches above 107°. Under appropriate treatment, however, a considerable proportion of patients have recovered even after the temperature has risen to a much higher point than this. It must be remembered too that in certain diseases of and injuries in connection with the nervous system the heat may become very excessive and yet recovery take place. 2. *Its type.*—All low forms of fever are very grave, and any tendency towards typhoid or adynamic symptoms, especially if the nervous system is much affected, is to be looked upon with anxiety. 3. *Defective elimination.*—This is a bad sign, particularly if associated with a very high temperature. 4. *The previous state and health of the patient.*—Young, robust, and plethoric persons are often more severely affected than those in opposite conditions. Some diseases, such as gout, increase the danger of febrile disorders considerably; while the presence of organic disease, especially of the kidneys and heart, renders them exceedingly grave.

TREATMENT.—The management of cases attended with fever is often a matter of much difficulty, and requires the most careful and constant attention. There are two rather prevalent errors which need to be guarded against. First, it must not be imagined that treatment is of no avail in febrile diseases, and that the physician has nothing whatever to do. By *judicious* interference it is possible to avert death, to relieve symptoms, and even to hasten recovery in some cases. On the other hand, *over-active* and *meddlesome* treatment is most injurious and should be decidedly deprecated, especially in the case of those specific fevers which must run a definite course. The practice of endeavouring to *cut short* fevers has unquestionably often done much harm.

There are certain general indications for the treatment of the *pyrexial condition*, which will now be briefly considered, as well as the means of carrying them out. They are as follows:—

1. *To diminish the temperature if this tends to be excessive.*—One of the most powerful means available for this purpose is the *external application of cold*. This acts partly by increasing the elimination by the skin, but also probably by producing some marked effect upon the nervous system and checking destruction of tissues, or, as Dr. Beale thinks, by diminishing the growth of bioplasm. The modes of applying cold are various, viz., by sponging the surface of the body with water, either tepid or cold; by cold affusion or douching, which may be practised whilst the patient is in a warm bath; by wet-packing in a sheet; by the use of cold baths; by the application of ice-bags to different parts; by injecting iced water into the rectum; or by placing the patient in a warm or tepid bath, the temperature of which is then gradually reduced by the removal of the warm and the addition of cold water or even ice, the latter being also sometimes applied to the head, spine, chest, or abdomen at the same time. After being kept in the bath for a variable time according as circumstances require, the patient is dried and removed to bed, and it may then be necessary to apply hot bottles to the feet. It is often requisite to repeat the bath even several times, and to apply ice in the intervals.

Some of the methods mentioned are not only useful in reducing temperature, but they likewise diminish the frequency of the pulse; give marked relief to low nervous symptoms; and may also have an influence upon the eruption in the case of the exanthemata, either in the way of encouraging it to come out, or of limiting its amount and improving its quality. Of late attempts have been made to establish a regular hydropathic treatment of all fevers, especially on the continent. But it seems to me, for reasons stated in a paper on the subject in the 'Practitioner' for January 1875, that this has no claim to be recognized and followed as a routine method of treatment, and that there are grave objections against it, especially against the more severe methods by which it is carried out. Cold or tepid sponging of the skin is the only mode applicable to ordinary cases, and this certainly ought to be practised much more frequently than is the case at present, for it is often decidedly beneficial and affords much relief, while it is not at all dangerous if proper care is exercised. The cases, however, in which the use of external cold is so eminently serviceable are those in which the temperature shows a tendency to rapid ascent, or in which it has become very high and remains so. Those treated and recorded by Dr. Wilson Fox and others prove conclusively the remarkable benefit which may be derived from the use of cold in the manner last described, when there is hyperpyrexia. Undoubtedly under similar conditions it is not only advisable to follow the same mode of treatment, but this is the *only method* which seems to offer any chance of recovery. Of course it must always be conducted under the strictest supervision, and its effects carefully watched.

Venesection has been employed with the view of lowering fever, but there is positive evidence that it acts most injuriously, and therefore should never be practised with this object in view, although in the inflammatory variety it may be required. Among medicinal agents, *aconite*, *digitalis*, *veratrum viride* and *antimony* are, in appropriate cases, very useful in fevers. They reduce the temperature in some degree, but have also a striking effect on the pulse, diminishing its frequency. Some of them act further on the excretory organs.

Quinine is much used for the purpose of lowering temperature or checking its ascent. It is well known that this drug has a powerful influence upon ague, and when given in considerable doses, it appears to have some power of diminishing excessive heat. Five, ten, fifteen, twenty grains, or even more are given at variable intervals, according to circumstances, and its administration may be combined with the application of cold.

Sulphurous acid, in drachm doses every two, three, or four hours, has been recommended.

2. Another important indication is to *watch the excretions*, and observe whether proper elimination is taking place. Some advocate energetic eliminatory treatment in fever, by which they propose to get rid of any morbid poison, as well as of the products of destruction of tissues. This, however, is not advisable as a general thing, except in so far as it may be necessary to keep the bowels freely open, and to give some mild diaphoretics and diuretics; but it is requisite in severe cases to examine the excretions, especially the urine, and ascertain if the materials formed are being properly removed, and if they are not to adopt measures which will aid their discharge. Should symptoms arise indicating that the system is being poisoned by the accumulation of the products of tissue-change in the blood, energetic eliminatory treatment is decidedly called for. This consists in measures which promote the free action of the skin, bowels, and kidneys. Diaphoretics and diuretics are very useful, such as saline mixtures containing citrate of potash or ammonia or liquor ammoniæ acetatis, along with the free use of diluent drinks. The new drug—Jaborandi—will probably be found valuable in some febrile diseases, on account of its diaphoretic action. The employment of baths as already described also increases the skin action. In severe cases, should the urine be deficient it is desirable to endeavour to excite the kidneys into activity by applying hot fomentations, linseed-meal poultices, or sinapisms, over the loins, or by means of dry cupping. Purgatives must be

employed with caution, as they are likely to weaken the patient, but they are often required, and the saline aperients are the most efficient in these cases. When diarrhœa is present, some advocate that it should be permitted to continue or even be aided by medicines, as this is a natural mode of elimination of a poison. It certainly is not always well to check this symptom, but if it is excessive and the patient is becoming evidently weakened, it is, in my opinion, decidedly advisable to restrain it by appropriate remedies.

3. One of the most necessary and difficult parts of the treatment in many cases of fever is the *administration of proper diet*, including food and alcoholic stimulants, *in a proper manner*. The food must be nutritious and at the same time capable of easy assimilation. Milk is a most valuable article of diet, as well as beef-tea, chicken-broth, eggs, &c. A most important matter which it is often necessary to attend to is to give the food at *frequent and regular intervals*, in *definite* and *moderate quantities*, and a patient should not be allowed to sleep for too long a time and thus be deprived of the requisite nutriment. It is quite impossible to lay down any definite rules, as each case must be treated on its own merits. In the low forms of fever large quantities of nutriment are called for.

With regard to *alcoholic stimulants*, these are by no means always required and their indiscriminate use may do a great deal of harm, but in a large number of cases they are very valuable, though much experience is necessary in order to determine what form to give, and what quantity, under different circumstances. Therefore young practitioners should be particularly cautious as to how they employ them, and should watch their effects very closely. Wine or brandy generally answers best, of which it may be necessary to give very large quantities, and it is astonishing how much may be taken in certain cases without producing the ordinary intoxicating effects of alcohol. It is most important that stimulants should be administered at *regular intervals* and in *definite doses*. The essential value of alcohol consists, not in its making up for food, which must be given at the same time, but in that it maintains the action of the heart while the system is struggling against the fever; hence the chief indication for its use is to be found in the condition of this organ, as shown by its impulse and sounds; by the state of the pulse, as regards its frequency, force, and amount of tone; and by the condition of the capillary circulation. Other organs, however, must not be overlooked, and in judging of the effects of the administration of stimulants, attention must be paid as well to the tongue, skin, respiratory organs, and nervous system. Their good effects are seen in the tongue becoming moist and less furred, the skin perspiring, the temperature reduced, the number of respirations diminished, and the nervous system calmed. If the tongue becomes dry and baked, the skin burning and non-perspiring, the respirations hurried, and the nervous system excited, alcohol is doing harm. With regard to its influence on temperature, it is proved only to lower this directly when given in large quantities, and then only to a slight degree. My own experience has convinced me that in hyperpyrexial cases it is requisite to be exceedingly careful in the administration of alcoholic stimulants, and that they ought not to be poured into the system in a reckless manner, with the view of lowering temperature.

It is in the later stages of fever that alcohol is most useful, and especially when it tends towards an asthenic or adynamic type. No case, however, should be allowed to sink into a low condition for the want of stimulants, as it may then be very difficult or impossible to revive the patient. If there is any probability of this event taking place they should be employed from the first. At the same time it is very important in these cases to watch thoroughly, and to observe at frequent intervals the effects of the administration of stimulants, lest they should be pushed too far. This may be judged of partly by the smell of the breath. They must be given with particular caution if the urine is very deficient or contains albumen. As to the quantity required, this will vary much in different cases. Usually from a tea-spoonful to a table-spoonful of brandy will be needed at intervals of from 3 hours to half an hour. Old people require a great deal as a rule, and young children bear stimulants well. Wine or brandy may be conveniently given beaten up with eggs, the Mist: sp: vin: gallici being an excellent preparation, or along with beef tea.

Dr. Beale has arrived at the following conclusions respecting the good effects of alcohol in cases of fever and inflammation:— 1. By its *direct* action on the nerves of the stomach it immediately stimulates the heart's action, and thus promotes the capillary circulation. 2. After absorption into the blood it alters the consistence and chemical properties of fluids and solids, and cuts short the life of rapidly growing bioplasm, or causes it to live more slowly. It reduces the permeating tendency of blood-serum; renders the walls of the vessels less permeable to fluids; checks the disintegration of blood-corpuscles; interferes with or modifies chemical changes; and has a direct action upon the particles of naked and living bioplasm.

4. Attention to *hygienic conditions* is another point of much importance in connection with fever. This matter will be again specially considered, but in the meantime it may be stated that two of the most essential requisites are *free ventilation*, so as to get plenty of fresh air and to remove that which is vitiated; and *cleanliness*. Rest of the body and mental quietude are also most important elements in the treatment of many febrile cases. Patients should not be disturbed by the presence of friends or others who are not required in the sick-room. Of course *competent nursing* ought to be specially provided, and the nurse should wear dresses which do not rustle, and to which, in the case of contagious fevers, the contagious poison will not readily adhere.

5. Many *symptoms* arise in the course of febrile diseases which require special treatment, and in order to avoid repetition it may be useful to consider here the more common of these in some detail.

Symptoms referable to the digestive organs are often troublesome. *Thirst* is almost always complained of more or less. For its relief the following drinks will be found agreeable in different cases, viz., simple iced-water; barley-water; toast and water; milk with soda-water iced; solution of chlorate of potash (ʒj to Oj), which may be flavoured according to taste; some acid drink, such as lemonade made with the juice of lemons, or a drink composed of ʒj of dilute hydrochloric acid with Oj of water or barley-water and a little honey or sugar; tamarind-water; iced champagne and seltzer-water in small quantities, if stimulants are indicated. The frequent sucking of small fragments of ice will generally be found of much service. Patients may also in most cases be allowed to suck juicy fruits in moderation, such as grapes or oranges. It is often necessary to give instructions to the nurse to cleanse the mouth from time to time. *Vomiting* is not uncommonly a symptom needing attention. Many practitioners adopt the plan of giving an emetic at the commencement of any febrile attack, but the advantages of this routine method of treatment are by no means obvious. If, however, vomiting or an inclination to vomit seems to be due to something irritating in the stomach, an emetic is useful, such as a full dose of vin. ipecac. or sulphate of zinc, followed by plenty of luke-warm water. In order to check vomiting special care must be taken as regards food, and it will be well to give nothing, if this symptom is troublesome, except very small quantities of iced milk with lime-water or soda-water at frequent intervals; or a tea-spoonful of brandy with the same quantity of strong beef-tea or beef-juice. Iced champagne with seltzer-water in small doses is also very serviceable, as well as the sucking of ice. With regard to medicinal remedies, the most efficacious in febrile conditions are effervescent draughts with 3 or 4 minims of hydrocyanic acid; or the latter with a little mucilage or bismuth. If opium or morphia is admissible, it is useful in some cases to add 3 to 5 minims of tincture of opium or solution of morphia to each effervescent draught. When the sickness resists the ordinary remedies, minute doses of strychnia sometimes have a remarkable effect in check ing it. Local applications over the epigastrium are also serviceable in obstinate cases, viz., linseed-meal poultices, sinapisms, flying blisters, or cold by means of the ice-bag. Care must be taken that the tendency to vomiting is not kept up by anything wrong in the sick room, such as bad smells or deficient ventilation.

The bowels very often require to be regulated. In most cases *constipation* is the symptom which it is necessary to treat. For this the best remedies are the ordinary black draught; sulphate and carbonate of magnesia with peppermint-water; Seidlitz powders; castor-oil; or, for children, rhubarb and magnesia. Under some circumstances more powerful purgatives are required. *Diarrhœa* sometimes needs to be checked, but it must be borne in mind that this may be a mode of elimination and it should not be heedlessly interfered with. It may be generally stopped, if necessary, by the ordinary remedies in different combinations, such as opium in the form of pill, tincture or enema; bismuth; chalk-mixture; tincture of catechu; mineral acids; Dover's or compound kino powder, &c.

Head symptoms are among the most common needing attention in medies, certain medicines are very useful in adynamic cases, viz., ammonia with decoction of bark, quinine in full doses, mineral acids, sulphuric or chloric ether, chloroform, camphor, musk, &c. At the same time sinapisms may be applied over different parts. When there is great depression, strong coffee and phosphorus have been found serviceable. If patients cannot be made to swallow easily, recourse must be had to enemata, by means of which food and stimulants as well as medicines may be administered. It is important in these cases to look to the bladder and to see that it is properly emptied.

6. In acute fevers it is requisite to watch for and guard against local *complications* as far as possible, and to treat them as they arise. It is especially needful to look to the state of the lungs, as these organs are very liable to become the seat of hypostatic congestion or inflammation. Position will have some influence in preventing this, the patient not being allowed to lie with the head too low, change of posture from time to time being also encouraged. It is further advisable to promote cough and expectoration occasionally, so as to avoid any accumulation of mucus in the bronchial tubes. Inflammations arising in the course of fevers do not contraindicate the use of stimulants, provided they are otherwise called for. Indeed, not uncommonly they indicate a necessity for more of these remedies. Particular attention should be directed to the prevention of bed-sores, as they are very prone to occur. The parts upon which the patient lies must be examined frequently, and kept dry and clean; should there be any signs of irritation, a water-pillow or bed ought to be employed, and the parts washed over with spirit and water.

7. Great care is usually required during convalescence from fevers, as regards diet, hygiene, and medicinal treatment. Tonics and remedies for promoting digestion are very beneficial as a rule. Undue muscular exertion and fatigue must be avoided for some time. Change of air is often attended with marked benefit, and hastens convalescence considerably.

CHAPTER II.

ON CONTAGION AND EPIDEMICS.

1. CONTAGION.

THIS is the most convenient place for entering upon a brief discussion of the main facts and theories associated with this most important subject, because, though it has to do with some other maladies, its chief interest is connected with the acute specific fevers. Using the word in its general sense, a "contagious disease" may be defined as "a disease which is capable of being transmitted from one animal to another, either of the same or some other species." The agent by which it is so transmitted is the *contagium*.

abrasion or ulcer, either on the skin or a mucous surface. Hydrophobia, syphilis, and vaccinia are examples of diseases which can only be propagated in this way.

Another mode of communication is by *direct contact*, without any breach of continuity of the surface. This has been especially termed transmission by *contagion*, but it is not advisable thus to limit the use of this word. It is particularly through mucous membranes that contagious poisons enter the system in this way, as is well illustrated by gonorrhœa and purulent ophthalmia. Parasitic diseases are propagated by contact *e.g.*, scabies; and it is stated that malignant pustule may arise in consequence of the matter soaking through the skin.

Many contagious affections can be conveyed from one individual to another without the necessity of any immediate contact between them. The contagium is given off into the surrounding atmosphere, and thus passes to the unaffected person, being then inhaled or swallowed or absorbed by the skin. To this mode of communication many would limit the application of the word *infection*. The poison may also get into the food, such as milk, and be thus taken into the system. Further, the contagious elements often become attached to what are termed "fomites," viz., articles of clothing, especially those of a woollen, silken, or cotton fabric; bedding and bedclothes; hair and various other articles, and are thus propagated. They may retain their activity under these circumstances for long periods, and in this way be the means of originating their several diseases after considerable intervals, though they tend to become weakened by time. Persons passing between the sick and healthy often carry a contagious disease to the latter. A contagious poison may also be conveyed by clothes sent to be washed or sent home from an infected school, by letters, cabs, and numerous other agencies. It frequently becomes attached to furniture or the floor and walls of rooms, and thus infection may arise after an indefinite interval, if the apartments have not been properly disinfected.

Flies and other insects are believed to be the means of disseminating contagious diseases in some instances, by alighting first on diseased and then on healthy individuals. Drinking water is a most dangerous medium for conveying the poison of cholera and typhoid fever, in consequence of the excreta finding their way into it.

Some contagious maladies may be communicated by all the modes just considered, others only through one of them, as will be pointed out when treating of these affections individually. The opinion has been expressed that they are all inoculable if the necessary conditions could be ascertained, but there is no proof of this.

After it has reached a person the contagious poison attaches itself to the skin, as well as to the mucous membrane of the mouth, nose, throat, respiratory passages, alimentary canal, &c., and may even find its way into the air-cells of the lungs. It then passes through the thin membranes, or becomes embedded in the thick mucous tissue, through which it gradually finds its way, or it penetrates the little chinks between the epithelium cells of the skin. Thus it reaches the minute capillaries and lymphatics, into which it enters and is then carried through the system. Absorption is promoted by a swollen, soft, and moist state of the skin, or by a weak, distended condition of the capillaries; it is especially facilitated by the presence of wounds or abrasions, and by such a condition as that of the interior of the uterus after delivery (Beale).

2. *Degrees of contagiousness of different diseases and modifying influences.*—There are marked differences with regard to the facility and certainty of transmission of contagious diseases. Some, such as small-pox, are very readily communicated; others, such as typhoid fever, are uncertain. Many modifying influences are also at work. The probability of a contagious disease being communicated is as a rule in proportion to the quantity and strength of the poison which reaches the system, but it must be remembered that in many instances a very minute quantity is sufficient. The virulence of the contagium also varies often at different periods in the course of a malady or of an epidemic. The *mode of application* has considerable influence, inoculation being obviously the most certain. It is believed that a contagium becomes weakened by passing through several persons. If any fluid containing a contagious poison is much diluted, there is less chance of successful inoculation. From experiments made with the lymph of small-pox, &c., it would appear that by allowing certain liquid materials which contain contagious particles to stand for some time, the latter subside to the bottom, so that the upper layer of fluid may be inoculated without producing any effect. By thorough filtration also the particles may be separated. This proves that the liquid portion has no power in transmitting the contagium, but that the latter resides in the separated particles. Much will depend frequently on the temperament, constitution, state of health, and previous habits of the individual to whom the contagium is applied, as to whether the disease will be transmitted or not. A previous attack of a contagious malady usually protects against a second, but not invariably, though when a second attack is observed it is generally of a mild character. Syphilis cannot be produced by inoculation after this has been done a certain number of times. It is uncommon but not impossible for two infectious diseases to be present in the same person at the same time, and, if such an event occurs, they generally modify one another; in some instances one exercises a protective influence against another, either temporarily or permanently, or modifies it greatly, as is well exemplified in the relation between small-pox and cow-pox. Some individuals seem quite insusceptible to certain infectious disorders, without any apparent reason for this. In such cases it has been suggested that the disease has occurred during intra-uterine life.

External conditions have a very important influence. Unfavourable hygienic circumstances undoubtedly increase the virulence of contagious poisons. It is believed that water intensifies the virulence of the contagium of typhoid fever and cholera. Climate and season have a considerable modifying effect, some diseases requiring a high temperature for their development, others being checked by much heat. The direct application of great heat or extreme cold, as well as of certain chemical agents, is of the highest importance in destroying contagious poisons and rendering them inert, as upon this depends in a great measure the power which is possessed of checking the spread of the diseases originated by them. Among the most active chemical substances are chlorine, iodine, hypochlorite of lime, chloride of zinc, sulphurous acid and sulphites, creosote, carbolic and cresylic acids, Condy's fluid, and chloralum.

3. *Nature of Contagion.*—There are certain contagious affections which are evidently dependent upon definite parasitic plants or animals, and in each individual disease of this class the particular animal or plant which originates it obviously constitutes its contagious element. With regard to the ordinary infectious diseases, it is assumed that in connection with each of them there is a "specific morbific agent or poison, capable of exciting and propagating this one disease and no other, and without the action of which upon the system it cannot possibly arise." This has been variously named a *contagium*, *virus*, *zyme*, or *ferment*. The nature and mode of action of contagia are questions which are warmly disputed at the present time, and towards the elucidation of which most important and interesting researches are being carried on. The discussion held at the Pathological Society during the last session, on the "Germ-theory of disease," which was introduced by a very able paper by Dr. Charlton Bastian, served to bring out the principal views entertained on this subject, and an endeavour will be made to incorporate these in the following remarks.

Some contagious diseases, and especially infective forms of inflammation, are associated with distinct morbid products, such as pus. It is commonly believed that in these affections the contagium is something distinct from these morbid materials, and that they only form a vehicle for its transmission, but several high authorities maintain, and this was the view advocated by Mr. Hutchinson in the discussion, that in the contagious inflammations the inflammatory products are themselves the means of contagion.

Putting out of the question the idea which some hold, that a contagium is a something—a subtle entity—which it will ever be impossible to separate or to distinguish, the theories which are at all worthy of consideration, and between which the main argument at present lies, may be classed as:—1. Chemical or physico-chemical. 2. Vital or Germ-theories. Under the former two chief views deserve to be mentioned, viz:—that the contagium in each case is a specific chemical compound, probably of an organic nature, and either solid, liquid, or in the form of a volatile gas; or that it is albuminoid matter in a state of rapid chemical and physical change—in short, mere decomposing organic matter. The germ-theory has been received with much favour, but many eminent investigators strenuously oppose it, and amongst these Dr. Bastian stands prominently forward, while others are very dubious and will not give any definite opinion on the subject. According to this hypothesis, it is affirmed that all contagious diseases arise from the action of *living germs*, which are specifically distinct from each other in the several individual affections. There is by-no-means an agreement in the opinions held as to the character of these supposed germs, or as to the precise mode in which they exercise their injurious influence. Those who adopt the germ-theory generally believe that they are *living microscopic parasites or their germs*, which may either belong to the vegetable kingdom, such as minute fungi; or to the animal kingdom, including living objects variously described as bacteria, vibrios, micrococci, microzymes, zoogloea, &c. With respect to the part which these organisms play in the propagation and development of contagious maladies, it is usually supposed that they themselves constitute *the contagium*, and that "their powers of producing disease are due to their organic development." Dr. Burdon Sanderson has suggested "that they may serve as carriers of infection from diseased to healthy parts, or from diseased to healthy individuals, and yet be utterly devoid of any power of themselves originating the contagium they convey." Prof. Lister has advanced the view "that the lower fungi and their relations bacteria, may contain in themselves some chemical compound absolutely peculiar to them, and forming part of their substance, which may act upon albuminous compounds after the manner of a ferment."

Dr. Beale entertains a very distinct germ-theory from that just considered. He maintains that the germs are not parasites, but that they are extremely minute particles of *living germinal matter* or *bioplasm*, which present no differences in appearance in different diseases, even under the highest powers of the microscope, but have an essential difference in vital power. He says "a disease-germ is probably a particle of living matter, derived by direct descent from the living matter of man's organism." Dr. Maclagan, in the discussion at the Pathological Society, while advocating the germ-theory, gave it as his opinion that "the organisms which produce the phenomena of disease are not those which we see and describe as bacteria, but other and much more minute organisms." He added "I think, indeed, it is still an open question whether true disease-germs have ever been seen. Of their existence we judge by the phenomena to which they give rise."

The arguments upon which the commonly-accepted germ doctrine mainly rests are that this doctrine explains more satisfactorily than any other the phenomena which contagious diseases present, the multiplication of contagium within the body, as well as its power of retaining its vitality for long periods and resisting destructive influences; and on the fact that tissues which are the seat of infective inflammations are filled with bacteria, while definite and specific organisms have also been found in connection with certain contagious disorders, viz., by Dr. Klein in the pustules of sheep-pox, (which is identical with small-pox), and in the intestinal lesions accompanying typhoid fever; in the vesicles of vaccinia; and in the blood in cases of relapsing fever. Fungoid growths have also been described in connection with cholera, but Drs. Lewis and Cunningham have failed to discover any such organisms after the most careful and searching investigations. The bacteria present in inflamed tissues are, however, considered by Bastian and those who agree with him, not as the cause of the morbid process, but as pathological products, being developed from pre-existing germs, the tissues undergoing a bacterial degeneration.

4. *Effects of the action of the contagium upon the system, and the changes it undergoes.*—The effects may be entirely local and superficial, as in the case of scabies, and probably gonorrhœa; or they are at first local, but subsequently become general or constitutional, *e.g.*, syphilis. As a rule, however, the primary action of the morbific principle is on the general system, and this is usually followed by local lesions. At present attention will only be directed to this last course of events, as connected more particularly with the specific fevers.

When the poison of a "specific fever" enters the system it is generally believed to produce some primary change in the blood, but some think that it acts first on the nervous system. The blood becomes soon altered in its physical and chemical characters, its fibrin being especially diminished. It is a favourite notion that a fermentative or *zymotic* process is set up, and that there is an analogy between ordinary fermentation and the mode of action of contagia. This supposed analogy, and the belief that fermentation is invariably associated with the growth of low organisms, which, however, recent researches seem to contradict, laid the foundation for the germ-theory as applied to contagious disorders. Bastian rejects the idea of any such analogy, and maintains that the action of a contagium is merely a chemical or physical one upon the blood and tissues.

After a contagium enters the system it undergoes rapid increase, and those who adopt the germ-theory assume that it is capable of self-multiplication, the germs multiplying probably at the expense of the albuminous elements of the blood, walls of the vessels, and tissues, so that the minutest quantity of a contagious poison introduced into the body may generate an enormous amount of the same. There is no adequate proof of this, however, and all that can be said is, in the words of Dr. Murchison, that the "poison is multiplied." At first there is no evident sign of the action of the contagium upon the system, but a *period of incubation* ensues, differing in duration in different diseases, but having tolerably defined limits in each several malady. This incubation period is generally considered as lasting from the time of entrance of the contagium into the system until the first onset of definite symptoms, there being in the meantime either no symptoms at all, or none of any distinct character. It may be very prolonged, as in the case of hydrophobia, which may remain dormant for many months certainly. In the case of the *eruptive fevers*, however, Dr. W. Squire and others reckon this period as terminating with the appearance of the eruption, but it will be more convenient in this work to follow the definition given above. The action of the contagious poison,

II. On Epidemics.

Diseases are divided into three classes, according to the manner in which they are disseminated among the population, viz.: 1. *Sporadic*, or those which occur in an isolated and scattered manner, and do not attack large numbers of people at the same time, *e.g.*, bronchitis. 2. *Endemic*, or those which are peculiar to certain districts, or which are constantly prevalent in these districts to a greater or less extent, *e.g.*, ague. 3. *Epidemic*, or those which suddenly attack large numbers of people, and spread rapidly amongst them, often causing great devastation; this occurring at irregular intervals, *e.g.*, cholera. These three classes, however, are not absolutely distinct. Sporadic cases of epidemic diseases are common enough, and these are frequently endemic in a district; for instance, typhus fever generally prevails in the filthy quarters of large towns. The terms *zymotic* and *miasmatic* are in common use to designate certain diseases. *Miasmatic* is a term applied to the *specific fevers*. The word *zymotic* does not imply any fermentation-theory of disease, but is now made to include all epidemic, endemic, and contagious maladies which are capable of being prevented by attention to hygienic and other conditions.

Attention will now be directed to the subject of *epidemics*. They are supposed to be caused by some *epidemic influence*, the nature of which is in most cases quite unknown. An epidemic may sometimes be distinctly traced to the influence of contagion, aided by unfavourable hygienic conditions, or to some other obvious cause, such as famine, but in most instances its origin cannot be thus definitely fixed. Certain diseases occur as epidemics which probably are not infectious, *e.g.*, influenza. Various theories have been suggested to explain the occurrence of epidemics under these circumstances. The *epidemic influence* or *constitution* has been supposed to reside in the atmosphere around us, and to depend upon the influence of the heavenly bodies; upon gases emitted in connection with volcanoes and earthquakes; upon the electrical condition of the air; upon the quantity of ozone in it; or upon the rapid development and migration of microscopic animalcules. All these, however, are mere hypotheses. When an epidemic of a contagious disease arises as the result of evident anti-hygienic conditions or from some other obvious cause, it is believed either that the specific poison is increased in quantity or rendered more virulent; or that the constitution of individuals becomes so altered as to make them more amenable to its influence and less able to resist it.

The chief facts observed in connection with epidemics may be stated under the following laws:—1. Epidemic influence chiefly affects those diseases which are infectious, rendering them more prevalent and more dangerous; or malarial diseases, *i.e.*, those due to a poison originating in the decomposition of vegetable matter. As a rule only one of these is epidemic at the same time, but sometimes there seems to be a tendency to the prevalence of several of the acute specific diseases together. Occasionally other maladies appear to assume an epidemic character; and now and then an entirely new disease makes its appearance in this way. Sometimes it is only the type of the ordinary diseases which is influenced, or there is a tendency to the implication of special organs. 2. The prevalent epidemic affects more or less the characters of other diseases. This is well illustrated in the case of cholera and influenza, choleraic diarrhœa being very common during the occurrence of the former, catarrhal affections during the existence of the latter. 3. The *extent* of an epidemic varies much. If this is very wide, the disease usually attacks different places in succession, becoming milder in one region as it invades another. It may be confined to a certain district, being then usually due to some evident local cause. 4. The *progress* is also subject to variations. Generally it is regularly onward in a definite direction, and in this way an epidemic may make the circuit of the globe. It may advance very rapidly or exceedingly slowly and gradually. Sometimes an epidemic seems to leave a place and then return, as if falling back upon itself; or it passes over special regions without affecting them; or it goes out of its course in a lateral direction, attacking parts not in the line of progress. Epidemics are not under the influence of winds, as they frequently advance in a direction directly contrary to these. 5. The *mode of onset* may be sudden or more or less gradual; usually the latter. An epidemic disease also generally gives indications of its approach by the occurrence of cases attended with some of its symptoms in a mild form; thus, cholera is generally preceded by cases of diarrhœa; or a few sporadic cases may occur, giving warning of its approach. 6. The *intensity* of an epidemic is subject to much variety, the disease being in some instances exceedingly fatal, in others comparatively mild. It is most virulent as a rule at the early period, judged by its characters and fatality. This is partly explained by the fact that probably those are first attacked who are most predisposed. 7. The *mode of disappearance* is generally gradual also, the cases becoming by degrees less severe and fewer in number; but it may be rapid, either from some evident cause or not. 8. The *duration* of an epidemic is very irregular. It may persist with intermissions for several years, *e.g.*, cholera. 9. *Cycles of epidemics* are frequently observed, one disease being after a certain time followed by another, and this by a third, and so on. The theory has been advanced to explain epidemics, that there is what is termed a *pandemic wave*, under the influence of which a series of *oscillations of febrile diseases* occur, these following each other regularly over the globe. 10. It is most important to notice that epidemics are greatly under human control, and that they can be prevented or made much less severe by attention to proper hygienic and other measures to be presently considered. With the advance of civilization some epidemic diseases have been entirely eradicated from countries and districts where formerly they were exceedingly rife; and by well-directed efforts there is no reason why many others should not be completely expelled. 11.

Epidemic influences seem to affect other animals at the same time as human beings, and it is not at all improbable that the same is true with regard to plants.

III. On the Hygienic Treatment of Contagious Fevers and the Prevention and Limitation of Epidemics.

A most important object to be kept in view, when treating a patient suffering from an infectious fever, is to prevent its extension to others, and the means which promote this end are also useful as regards the well-being of the patient. The measures to be attended to will now be briefly considered.

1. *Separation* is necessary from other individuals as far as possible, and in many cases almost complete *isolation.* At all events anything like over-crowding must be avoided, and only those persons who have any business in the sick-room should be admitted. They should wear clothes to which the contagium cannot easily adhere, and go as little as possible into the midst of healthy people. Medical men ought to take sufficient precautions against conveying any contagious affection. 2. Adequate *ventilation* is essential, and this is best carried out by placing the patient in a large room, and opening the windows more or less according to the weather, which should be done even at night, care being taken of course to protect against draughts. A good fire in the room assists ventilation. 3. All excessive curtains, bedclothes, carpets, and other things which may act as "fomites," ought to be removed. In this way also ventilation is promoted. 4. *Cleanliness* must be thoroughly attended to, as regards the patient, bed, clothing, room, &c. 5. Those who come close to the patient should avoid inhaling the breath or exhalations, and should afterwards not swallow the saliva but clean out the mouth and nostrils. 6 One of the most important matters to attend to is the *disinfection* or *complete destruction* of everything which might convey the contagion. In the first place all *exhalations and discharges* should be *at once disinfected.* Anything coming off from the skin is best destroyed by frequent sponging with some disinfectant. The air of the room should also be somewhat impregnated with some volatile material of this nature, such as chlorine (from chloride of lime), carbolic acid, or sulphurous acid. It is also recommended to place across the doorway a sheet moistened with dilute carbolic acid, Burnett's fluid, Condy's fluid, or chloralum. Secretions from the nose or mouth ought to be removed by disinfected rags and these immediately burnt. Excretions *should be received into utensils* containing some disinfectant, and thoroughly mixed with this before being removed from the room. This is especially needful in the case of those diseases which are known to be propagated chiefly by the stools, viz., cholera and typhoid, and if possible a separate water-closet should be used for the reception of the excreta in these affections, which should be frequently flooded with some disinfecting fluid. The

best disinfectants for this purpose are carbolic acid and powder, chloride or sulphate of zinc, chloride of lime, or chloralum. All clothing, bed-clothes, &c., must be put at once into vessels containing some disinfecting fluid, especially Condy's or chloride of lime, before being taken out of the room for the purpose of being washed. The clothes previously worn by a person suffering from a contagious disease ought also to be disinfected. The floor, doors, windows, &c., should likewise be frequently washed with some material of this nature. 7. Food, such as beef-tea, must not be allowed to remain for any length of time in the sick room, and should never be taken by anyone who is not habitually in it. 8. After the patient has left the room it should be thoroughly *cleaned and disinfected* in every corner, and then white-washed, or repapered and painted. Sulphurous acid, chlorine, or carbolic acid are most useful for disinfecting an unoccupied apartment. *Heat* is very valuable for disinfecting bedding and bed-clothes.

It is necessary to carry out these measures more or less thoroughly in proportion to the degree of contagiousness which the particular disease presents. For example, it is requisite to pay strict attention to them in the case of scarlatina and small-pox.

When an epidemic has appeared in a district or threatens to invade it, additional precautions are called for as regards attention to proper hygienic conditions and other matters. Under these circumstances it is requisite to teach ignorant individuals what to do, and to appoint competent persons to visit from house to house, to see that the different measures are properly carried out, especially in low and crowded parts of towns and cities. The chief practical points to be noticed are as follows:—

1. *Cleanliness* must be strictly observed in every particular. Frequent washing and white-washing of premises is required. 2. All over-crowding must be prevented and free ventilation insisted upon. It is particularly necessary to look to this among the poor, and in common lodging-houses or crowded alleys. 3. Persons who are likely to spread infection must not mingle with others in places of public resort. 4. Special attention must be paid to all *decomposing organic matter*, especially *house-refuse*. Everything of this description should, if possible, be at once removed, having been previously disinfected, or if it cannot be got rid of, abundance of disinfecting material must be mixed with it. House-drains and sinks, street-drains and sewers, water-closets, cess-pools, privies, ditches, &c., require careful and frequent examination, so that they may be kept in order. The earth in the neighbourhood of dwelling-houses is often saturated with organic matters, and therefore demands attention. During the removal of organic matters from houses, it is well for the inhabitants to keep away as much as possible. 5. Disinfectants should be freely employed in and around the houses, and especially where there is much filth. 6. It is most important to look to the source of the *water-supply*, especially that which is used for drinking purposes, and to see that no organic matter find its way into it from sewers, drains, cess-pools, polluted ground, &c. The waste-pipe of cisterns often opens into drains, and, owing to an imperfect

state of the traps, organic matters become mixed with the water. This point must be especially attended to during an epidemic of typhoid fever or cholera. On no account should water be taken which contains any organic matter, and it ought always to be filtered. 7. It may be advisable to remove healthy persons to some place where they would be free from the danger of infection. 8. If there is any known preventive of an epidemic disease, this must be at once resorted to and fully carried out. Thus vaccination should be thoroughly enforced during an epidemic of small-pox in the case of all who have not been previously vaccinated. 9. It may be requisite to carry out the practice of "quarantine." 10. It is important that the *general health* of the community should be maintained by every means possible, and all causes that tend to lower the system, such as intemperance or bad living, should be avoided. It is particularly necessary for those who attend upon the sick to take every precaution. They should live well but not take too much stimulants. They require daily exercise in the open air, but should avoid fatigue. They also need sufficient sleep, and must pay strict attention to cleanliness. 11. Any person who presents the *slightest symptoms* of the disease which is epidemic ought to be *without delay* brought under medical treatment. 12. On no account should an individual suffering from an epidemic disease be brought into the midst of a healthy locality, if this can possibly be avoided. The conveying of such persons by vehicles used by the public is a serious crime, which is now punishable by law. Special conveyances are provided should it be necessary to remove them to a hospital.

CHAPTER III.

ON THE CLINICAL INVESTIGATION OF ACUTE FEBRILE DISEASES.

A LARGE proportion of the cases which come under observation in ordinary practice belong to the class of *acute febrile diseases*, and it is most essential to have a clear notion how to proceed in their investigation, because it is particularly important that a correct diagnosis should be arrived at in these cases as speedily as possible. The special points which require attention are as follows:—

1. It is well first to enquire what febrile complaints the patient has previously suffered from, if any. It should then be ascertained whether the patient has been exposed to any infectious disease, or whether there has been any other obvious cause at work likely to give rise to a febrile condition, *e.g.*, malaria, cold, &c.

2. If possible, the *exact date, even the hour*, of the onset of symptoms must be fixed, and the *mode of invasion* determined.

3. The *symptoms* which have arisen in the course of the case are then to be inquired about, as well as the times at which they

ared, and those noted which exist at the time of examination
e patient. During the *premonitory or early stage* of the acute
ific fevers certain *local symptoms* are usually present, differing in
and more or less characteristic. Those which require to be
icularly investigated are,—the severity of general pains; the
tence of any localised pain, especially in the back or epigas-
n; catarrhal, throat, stomach, intestinal, and head symptoms.
ourse if the pyrexia is due to inflammation of some organ or
e, there will probably be local symptoms indicating the seat of
mischief.

. It is of the greatest importance to determine the *degree of py-*
a, as well as its *course* and *mode of progress*. This is done by the
eful and systematic employment of the thermometer. In the
even at a very early period much assistance is gained in ar-
ng at a diagnosis. In the *exanthemata* the fever is of the *conti-*
l type. By its degree of intensity and rapidity of onset the
re of the complaint may, in many cases, be foretold at a very
ly stage. Each fever is supposed to have a definite course of
perature, and on the whole this is true; but a good many
eptions are met with.

. Most of the *acute specific fevers* are attended with a *skin-erup-*
. This constitutes one of their chief *anatomical characters*, and
erally enables each of them at once to be distinguished from
others. It must be remembered, however, that it is not al-
ys present, for there is no doubt but that scarlatina, measles,
all-pox, &c., may run their course without any eruption. When
to inoculation it may be confined to the spot where the morbid
terial is introduced, *e.g.*, vaccinia. The points to be ascertained
h regard to any eruption are—*a.* The *exact time* of its appearance
er the first onset of symptoms. *b.* Its *primary seat*, as well as the
rts of the body to which it spreads and the mode and rapidity of
extension. *c.* Its ordinary *amount*. *d.* Its *precise characters* from
first appearance to its decline, including any changes it may
lergo during its progress. *e.* Its *duration*, both as regards the
ire eruption and its individual constituents. *f.* The cutaneous
elæ which may follow it, such as desquamation. *g.* The chief
eties it may present.

. In all febrile cases it is imperative to make a careful *physical*
mination of all the chief organs of the body, and *to examine the*
e. This may reveal the cause of the pyrexia even where there
no symptoms pointing to any particular organ. Besides, it
t be borne in mind that even in the specific fevers complica-
s are very liable to arise, or some of the organs may be
narily affected, and it is most important to detect any derange-
t in connection with these as soon as possible. Hence *daily*
mination at least should be carried out, and in many cases it is
isite to examine the principal organs even more frequently
this. The *sphygmograph* is of value as indicating the condition
e circulation.

ON THE USE OF THE THERMOMETER.

The value of the *thermometer* in the investigation of disease is at present so generally recognised in theory that it is unnecessary to enter into any discussion on this subject; at the same time it is desirable to impress upon all the extreme importance of employing this instrument in *daily practice*, because there can be no doubt that even now many do not use it to the extent which it deserves.

Neither is it requisite to give any detailed description of the instrument to be made use of. All that need be said is, that this should be sensitive and accurate; of a sufficient range; self-registering; and of a convenient size to be carried in the waistcoat-pocket. These conditions are fulfilled in the clinical thermometers which are sold in most respectable instrument shops.

Mode of use.—Before applying the thermometer, it should be warmed by holding the bulb in the hand, or in some other way, until the top of the *registering index* reaches about 98°, but care must be taken that it does not rise above this. The regions usually employed for taking the temperature are the axilla, the inner side of the upper part of the thigh, the mouth, rectum, or vagina. Sometimes it is requisite to notice *local temperatures*. It is necessary that the instrument should be in close contact with the surface and completely covered. When the temperature is taken in the axilla, which is the most convenient place on the whole, the patient should lie on the same side, and press the arm firmly to the side; or it may be necessary to strap it to the surface. The mouth does not afford accurate results, but it may conveniently be made use of to give approximate information, the thermometer being placed under the tongue and the mouth firmly closed. With regard to the time required for the instrument to be retained in its position, there is a difference of opinion. With proper precautions *five minutes* is usually sufficient, especially if " two observations at intervals of one or two minutes give exactly the same result" (Aitken). To be strictly accurate, however, many think that the mercury ought to *remain stationary for five minutes*. Baumler gives, in order to be scientifically correct—for the rectum, three to six minutes; mouth, nine to eleven minutes; axilla, eleven to twenty-four minutes.

It is desirable, if possible, that the individual upon whom the observation is made should have been at rest in bed at least an hour previously.

The intervals at which the temperature should be taken will vary according to the nature of the case. Often only one observation is required. In most instances twice a day is sufficient, viz., in the morning and evening, and in many once daily is enough. Sometimes, however, it is most important to note the temperature at very frequent intervals, or even to allow the thermometer to remain constantly applied. Should this be needful, it is advisable to teach the nurse or some other intelligent person how to use the instrument, and

ıt also employ it if any unusual symptoms should arise.
ses of fever it is requisite to have recourse to the ther-
until convalescence has been firmly established, for
ɔ be presently indicated.

g the thermometer the points to be observed are—1. The
heat, as indicated by the *end of the index most distant* from
of the thermometer. 2. The rapidity with which the mer-
, this being in proportion to the height of the tempera-
is often important to take a note at the same time of the
f the pulse and respirations, and in some cases it is desirable
a *quantitative analysis* of the urine, in order to determine
there is a relation between the temperature and the
f urea, uric acid, &c., discharged. All these observations
recorded on proper forms, of which several have been
the temperature being indicated by angular lines or

ature in health and chief modifying influences.—In the axilla
rature in health averages about 98·4° F. It may range
from 97·3° to 99·5° or even 100°, but if it goes beyond this
direction, and remains persistently above or below the
there is something wrong. The chief circumstances
luence the temperature in health are as follows:—1. *the*
body in which it is taken. It is higher in internal parts,
ıe rectum or back of the mouth, than in external parts;
ed regions of the body than those which are exposed;
trunk than over the limbs. 2. *Age.*—The temperature,
to most observers, is higher in children and young
han in adults. It also is said to rise in old age. 3. *Time*
.—During the day the temperature gradually rises until
and then falls slowly until early morning, when it again
In this way there is a variation of about 1·5° during the
ur hours in adults, but the range is greater in children.
e and exposure to heat or cold.—In the tropics the average
ure is a little higher than in temperate or cold climates,
ıy reach 99·5° or even 100° F. Long exposure to great
old will also influence it a little. 5. *Food and drink.*—After
eal the temperature at first falls, but it rises as digestion
. *Fasting* lowers the temperature. Alcohol seems to cause
fall, but this is only temporary, and a considerable quan-
quired in order to influence the temperature materially.
.rticles in daily use produce some effect, such as tea and
. *Exercise* increases the temperature, especially that of
mities, provided it is not sufficient to induce great fatigue.
ıged study and other forms of mental effort cause a
ɔression. 8. Mr. A. B. Garrod has found that the temper-
s on stripping off the clothes and exposing the surface of
and the difference is greater in proportion to the cold-
ıe surrounding air. When the temperature of the air is
F., there is a slight fall, but a rise to the previous tem-
soon takes place.

ief source of the animal heat is usually believed to be the chemical and vital changes in the food and tissues which are constantly going on in the body, the heat thus produced being diminished by evaporation from the surface, while the circulating blood causes the temperature to be uniform throughout. The influence of the nervous system upon temperature has been already considered. Dr. Beale believes that the *conversion of non-living into living material* is the cause of the production of heat.

The Use of the Thermometer in Disease.—In the great majority of cases the deviation from the normal as regards temperature which occurs in disease is in the direction of excess, there being more or less *pyrexia*. By the aid of the thermometer the amount of this increase can be accurately determined, and it is for this purpose that the instrument is chiefly employed. Occasionally the animal heat is below the normal, or it may be unequal in different parts of the body, but these deviations are not of nearly so much consequence. It may be mentioned here that Fahrenheit's scale is used throughout this work.

In this place it is only intended to sum up concisely the circumstances under which the thermometer is valuable. When treating of individual diseases it will be pointed out in connection with which of them the temperature presents any peculiar characters as to degree or range.

The information given by the thermometer may prove of valuable assistance as regards—1. Diagnosis; 2. Prognosis; 3. Treatment.

1. Much help is constantly derived from the thermometer with respect to *diagnosis*, and the following remarks may serve to gather up the circumstances under which it is thus useful. *a.* In many cases which present themselves in ordinary practice, where symptoms exist which might or might not belong to the premonitory stage of some acute illness, taking the temperature may at once clear up all doubt. Thus we have frequently found in the out-patient room, where symptoms suggestive of scarlatina or small-pox were complained of, by the help of the thermometer we have been enabled to negative the supposition of either of these diseases being present, or, on the other hand, to corroborate such an opinion. In short, the instrument enables us at once to determine whether pyrexia is present or not, as well as its degree, and thus becomes a most valuable guide to the physician. *b.* Occasionally by one, or at most two observations, it is possible to ascertain positively the *nature of a fever*. For instance, if the temperature suddenly rises to 104° or 106° F., the patient having been quite well on the previous day, he is probably suffering from some form of malarial fever, and this is certain if the temperature falls rapidly, so that it becomes normal in a few hours. *c.* Many febrile disorders are now known to have tolerably regular and uniform ranges of temperature throughout their entire course, and to present peculiar diurnal and nocturnal variations, the temperature being, as in health, generally higher by night than by day. It is therefore essential to become acquainted with this portion of the *natural history* of each of these affections, and to employ the thermometer regularly

rs or during the period of convalescence, as well as re- are indicated by a disturbance of the typical range; by d defervescence; or by a rise in temperature after it has once d; and this may be the first thing observed. Hence the ty of taking a daily note of the temperature until the patient ite recovered. *f.* In certain diseases the thermometer gives ation as to whether a morbid process is actively progressing *e.g.*, in tubercular affections. Further, it may serve to dis- h between different forms of a particular affection; thus *ry phthisis* may be the result of different pathological condi- ind it is probable that these are characterised by distinct f temperature. Again, when hæmoptysis has occurred, the meter is useful in indicating whether any blood which re- in the respiratory organs has given rise to inflammation, ing attended with a rise of temperature. The same is true poplectic clot in the brain. *g.* Inequality of temperature is mes of aid in diagnosing paralysis or other nervous dis- .

'ord of caution is necessary with regard to children. In subjects the temperature may run up rapidly to a consider- eight when there is nothing very particular the matter, and re care must be taken not to jump to a hasty conclusion that s some serious disease present, simply because the thermo- indicates much pyrexial heat. It often falls just as speedily. he temperature may be of use in assisting towards a *pro-* either in itself, or from its relation to the pulse, respirations, or it of excreta, or its association with other symptoms. *a.* The *of heat* observed during the early period of a febrile disease, ally when taken in conjunction with the symptoms present, ten give a good idea as to whether a particular case is likely severe one or not. If it is at all high, it shows that a sharp may be anticipated, and that complications resulting from esence of products of decomposition in the blood are liable to from morning to evening, this is a favourable sign; if it is higher in the morning than on the previous evening, this shows that the disease is advancing and the prognosis is consequently more grave. *e.* In many pyrexial diseases the fever usually subsides on certain days, often by crisis; if in a particular case the expected fall takes place and defervescence goes on regularly and continuously, the prognosis is favourable; if the contrary, or if the decline of the fever is irregular, an unfavourable course is indicated. *f.* Should the temperature decline rapidly in certain acute febrile affections, such as pneumonia or typhus fever, while the pulse and respirations increase in frequency, and the other symptoms show no signs of improvement, but on the other hand become worse, the prognosis is very serious. A very low temperature is in itself an evil omen.

It must be remembered that accidental circumstances may temporarily modify the temperature in disease as in health, such as food, exercise, excitement, &c. It may be increased by sources of irritation, *e.g.*, retained urine or fæces, and on the removal of these it may be considerably reduced. Defervescence may proceed so far that the animal heat is brought below the normal, sometimes considerably. After convalescence from severe continued fevers the temperature is often low for some time. The same thing is also observed during the apyrexial periods of intermittent fever, and in the remissions of the remittent variety.

3. The value of the thermometer as indicating *treatment* may be gathered from the remarks already made, and it will be only necessary to give two or three illustrations. A *very high and ascending temperature* calls for prompt recourse to the use of cold, as already described under the treatment of pyrexia. In ague, after this disease has apparently subsided, it is found that the temperature still rises at the usual intervals, and until this has become quite normal for two or three days, treatment must not be discontinued. During convalescence from fevers an increase of heat may be due to something wrong in the diet or in the use of medicines, and it should lead to careful enquiry on all matters by which it might be produced, so that appropriate measures may be adopted.

In the following description of the individual *Acute specific diseases*, I have deemed it expedient in the case of the more common fevers, to omit the consideration of the *diagnosis* under each particular affection, and to devote a separate chapter to a general summary of this subject.

CHAPTER IV.

SIMPLE CONTINUED FEVER—FEBRICULA—SYNOCHA.

A CONSIDERABLE number of cases come under observation in ordinary practice, which present the usual symptoms of *fever*, but which cannot be referred to any of the contagious fevers, nor can the

ms be traced to any adequate local cause. Besides these
re not uncommonly anomalous forms, to which various names
een applied. Though many of these cases scarcely come
he class of acute specific fevers, they may conveniently be
ed here.

OGY.—Simple febricula does not seem to be contagious or
nd upon any specific poison as a rule. It may result from
xcessive heat, such as long exposure to the sun; over-eat-
lrinking; or great fatigue. Often no distinct cause can be
ut. Probably some of the cases are due to the action of
the contagious poisons, modified by the constitutional condi-
the individual, or by the quantity entering the system being
nute. I have known a severe epidemic of typhoid fever to
eded by cases of mere febricula.

TOMS.—Febricula is characterised by the ordinary signs of
their most typical and simple form, but of variable inten-
The *invasion* is indicated either by chilliness or slight rigors,
neral pains, lassitude, and headache. Then the skin be-
ot and dry, and the pulse frequent and full. Severe head-
often complained of, the face is flushed, while the patient is
and sometimes delirious at night. There is thirst, with
ongue, loss of appetite, and constipation. The urine is fe-
Frequently symptoms are present indicative of catarrh of the
membranes, but these are not sufficient to account for the
. Roseolar or erythematous eruptions have been described
aring in some instances, and also certain bluish spots.

rise in temperature is rapid, and it may reach 102°, 103°, or
4° in a few hours. This high temperature, however, only
a short time usually, often but a few hours or at most one
days, and then it falls rapidly.

TION AND TERMINATION.—The *duration* is generally about 3
ys, but a case may last a week or 10 days before convales-
complete. Defervescence is usually by *crisis*, the tempera-
ling to the normal in from 24 to 36 hours, and there being
us discharge of urine with abundant deposit of lithates, free
ation, and sometimes diarrhœa, or epistaxis. Occasionally
scence is by *lysis*, convalescence being consequently delayed.
mination is always in recovery.

TMENT.—All that is required is to keep the patient in bed;
diet of milk, beef tea, &c., with cooling drinks; open the
freely; and administer some simple saline mixture. If
much heat of skin tepid sponging is very useful. During
scence quinine may be given.

CHAPTER V.

TYPHUS FEVER.

ETIOLOGY.—Typhus fever is generated by a *specific poison* and is highly contagious. This poison is principally given off in the exhalations from the skin and lungs, being afterwards inhaled or swallowed. These exhalations have a peculiar odour. Infection is far more likely to happen in the case of those who are brought into close and frequent contact with the sick, and hence nurses and medical men are very liable to be attacked. It must be borne in mind, however, that if there are a number of cases congregated together, so that the poison is concentrated, a very short, even a momentary exposure may cause the disease to be transmitted. The contagious influence does not seem to spread to any great distance, and is much weakened by dilution with air. In well-ventilated private houses the disease rarely spreads, and it never extends from hospitals to adjacent streets. It is more likely to pass from a low storey to a higher than in the contrary direction. Fomites, such as clothing, bedding, furniture, or the walls of rooms, may retain the contagium for some time if not properly disinfected, and may thus subsequently originate the disease in the same place or convey it to other districts. Woollen and dark-coloured materials are said to take up the poison most readily. Typhus fever is stated to be most contagious during convalescence, but infection probably lasts from the end of the first week until convalescence is established. A second attack is an exceedingly rare event.

The opinion is strongly held by some eminent observers that typhus fever may be produced *de novo*, independently of any infection, in consequence of great over-crowding and destitution.

Predisposing Causes.—There are certain circumstances which greatly intensify the action of the typhus contagium and render individuals more liable to be attacked. These are:—1. A low physical condition, induced by intemperance and bad feeding, or chronic disease. 2. Over-crowding and deficient ventilation, especially over-crowding of dwelling-houses, or of individuals in the same house or room with bad ventilation. 3. Want of cleanliness, domestic and personal. 4. Mental depression, from over-work or anxiety, or fear of contagion. 5. A temperature not too high. In consequence of the action of these causes, typhus fever is infinitely most prevalent amongst the poor; in the crowded parts of large towns, especially in those places where the sanitary arrangements are inefficient; in low regions; in crowded camps or dwelling-houses, such as low lodgings; and in cold and temperate climates. Epidemics are also very apt to arise during periods of distress and famine from any cause. Typhus seems to be much more rife in Great Britain and Ireland than in other countries, and it is stated moderate rigors, or with one severe and prolonged fit of shivering, followed by pyrexial symptoms. The rigors often recur for two or three days. There is a marked sense of depression and exhaustion, the patient speedily taking to his bed and presenting an aspect of weariness and heaviness, or even of considerable prostration. General muscular pains are complained of, and the limbs tremble on movement. Nervous symptoms are prominent. These are dull frontal headache, often severe, with a feeling of heaviness in the head and throbbing; giddiness; more or less dulness of hearing with noises in the ears; flashes of light and photophobia; sometimes an unpleasant smell; restlessness and disturbed unrefreshing sleep, though the patient is often very drowsy. The mind soon begins to wander and becomes confused as to time, place, and surrounding circumstances and individuals, distinct delirium setting in from the fourth to the eighth day, which is not constant at first, while the patient can be roused to answer questions. It is most frequently of a dull and muttering character, but may be extremely active and excited at the outset, the patient being sometimes very violent. The expression is heavy and indifferent, the eyes are injected and suffused, and a more or less dusky flush covers the cheeks, the complexion having a dingy and dirty appearance.

Nausea and vomiting are sometimes present and may be distressing symptoms. The tongue is at first covered with a thick white fur, but soon tends to become dry and brown; it is often tremulous. There is much thirst, with total anorexia and a disagreeable slimy taste in the mouth. The bowels are generally confined, but diarrhœa is not uncommon, the stools, however, presenting no peculiar characters and being usually dark. The spleen can often be detected to be enlarged.

The skin feels hot and pungent. The pulse becomes frequent, rising steadily to 100 or more, and being often large and full, but very compressible; it may be small and weak or dicrotic. The urine is markedly febrile.

Commonly there are signs of more or less catarrh of the nasal and respiratory mucous membranes, with cough and expectoration, and some dry râles may be heard over the chest.

2. *Eruptive Stage*——Two forms of eruption are observed in typhus fever, viz.—*a subcuticular mottling*; and distinct *maculæ or mulberry spots.* Usually both are present in variable proportions, but the mottling is not unfrequently noticed without the spots, though the latter very rarely appear without the former. Children often do not exhibit any rash and in them the mottling is most marked. The eruption usually appears on the 4th or 5th day, but may come out at any time from the 3rd to the 7th or 8th day. The back of the wrists, borders of the axillæ, and epigastrium exhibit it first; it then spreads rapidly over the trunk and limbs, but is rarely seen on the face and neck. *The rash is all out within one, two, or three days, and no fresh spots are developed after this, while each spot is perceptible until the entire rash disappears.* The *amount* varies consider-

extremely injected and suffused, the pupils being often contracted. The skin of the extremities becomes cold and perspiring. The tongue is dry, brown, and cracked, frequently covered with a thick, blackish crust, and immovable; its surface is red and tends to bleed; while sordes cover the lips and teeth. Patients drink with avidity, but deglutition is difficult. The nostrils are stuffed up. Tympanitis is sometimes a prominent symptom. The pulse rises to 120, 140, 150, or more, but remains stationary after reaching a certain point; it becomes small and weak and may be irregular. The heart's impulse and sounds are feeble, especially the systolic sound, and capillary stasis is very liable to arise. Respiration is much hurried and disturbed, and frequently unduly abdominal. The breath has a most peculiar aud unpleasant odour. Physical examination of the chest reveals bronchitic râles, or more serious complications may be detected. Incessant hiccup is sometimes a distressing symptom.

The urine is not uncommonly albuminous or contains a little sugar; it may be retained or passed involuntarily along with the stools. Bed-sores are very liable to be produced over parts which are pressed upon.

The severity of the symptoms varies much in different cases, but if a case goes on to a fatal issue, prostration becomes more and more complete, the heart's force is exhausted, and the nervous symptoms indicate that the nerve-centres are still more disturbed. Before death the temperature may rise or fall rapidly, and in some instances the pulse suddenly falls. Complications may arise to hasten a fatal result.

3. *Stage of Defervescence.*—This sets in in cases of recovery from the 13th to the 17th day, generally at the end of the second week. There is a remarkable and sudden *crisis*, which often occurs at night, the patient falling into a deep sleep lasting for many hours, on awaking from which a wonderful improvement is observed in the aspect of the patient and in the symptoms. The temperature falls considerably, as well as the pulse, which gains in strength. The skin is soft and perspiring, the eruption less marked, and the complexion clearer. The tongue becomes moist and cleans from the edges, either in patches or molecularly, and there may be some inclination for food. Delirium has ceased, the patient recognises those around, but the mind is still confused and entirely unconscious of all recent events. There is a sense of extreme weakness, and the limbs feel as if they did not belong to the body. Unless complications or sequelæ interfere, convalescence begins at once and the strength is regained comparatively rapidly, but it is some time before this is completely restored. The tongue soon cleans, and the appetite becomes perfectly ravenous; it is only those who have experienced it who can realise the extreme sense of hunger which is felt. Much sleep is indulged in, and the mind does not regain its normal vigour for some time. A relapse of typhus is extremely rare.

Temperature.—Different observers have described different ranges of temperature in typhus fever, and this appears to depend partly [illegible] swelling and abscesses in various parts of the body. 9. Synovitis, or inflammation of joints. 10. Renal disease.

TERMINATIONS AND DURATION.—Most of the cases of typhus fever end in recovery. The mortality varies in different epidemics, but the average number of deaths is stated to be about 1 in 5. The average duration is about 14 days, but it may extend to 21 days; if beyond this it is due to complications. On the other hand a case may run a much shorter course. Death may result from coma or syncope, or, most usually, from both causes combined; or it may be due to complications.

PROGNOSIS.—This is always grave and a very guarded opinion should be given. The chief general circumstances which increase the danger of any particular case are as follows.—1. The patient being of middle or advanced age. 2. The male sex to some degree. 3. A low condition of the system, either constitutional, or due to privation or fatigue, intemperate habits, previous diseases, &c. A gouty constitution is most dangerous. 4. Mental depression and a presentiment of death on the part of the patient. 5. Improper hygienic conditions, especially bad ventilation and overcrowding. 6. Neglect of proper treatment until a late period.

The symptoms and complications present afford most important indications as regards prognosis. Those of unfavourable import are: 1. Extreme prostration, with a dry, hard, brown tongue; marked tympanitis; or persistent hiccup. 2. Great feebleness of the heart's action, as evidenced by the impulse, sounds, and pulse; or very excited action with weak pulse; or an exceedingly frequent pulse, which is at the same time extremely feeble, irregular, or intermittent. 3. Severe and early cerebral and other nervous symptoms, especially continued sleeplessness with delirium; deep coma or *coma-vigil*; muscular tremors, twitchings or rigidity, carphology, subsultus tendinum, *convulsions*, early relaxation of the sphincters, strabismus, and *great contraction of the pupils*. 4. A very high temperature, without any remission on the 7th day, especially if it persists and shows a tendency to rise; or a *sudden fall*, the other symptoms not improving. 5. A large amount and dark colour of the eruption, especially if with numerous petechiæ, and if there is lividity of the face and limbs, with deep congestion in dependent parts. 6. Suppression or retention of urine; deficient elimination of solids; the presence of much albumen or blood in the urine, especially if associated with casts; and particularly the early occurrence of these symptoms. 7. Signs of collapse. 8. Pulmonary complications, gangrene, erysipelas, &c.

TREATMENT.—The principles already laid down with regard to the treatment of *fever* are those which must be followed in the management of cases of typhus. There is no possibility of stopping its course, and all that can be done is to assist nature in bringing the disease to a satisfactory termination.

It is most important to attend strictly to all the hygienic conditions which demand attention in contagious fevers, and particularly to look after every point connected with the sick-room, including the nursing. These matters are often of greater moment than any medicinal treatment, and always aid considerably in conducting a ase to a successful issue, while they prevent the dissemination of he disease.

It may be laid down as an invariable rule of practice that patients suffering from typhus *will not bear any kind of lowering treatment*, ut that they always need to be supported more or less, and their trength must be husbanded in every possible way. They should ake to bed *at once*, and use no exertion whatever, on no account being permitted to get up to stool, but a bed-pan being employed. From the first a nutritious and easily assimilable *diet* must be administered, chiefly consisting of liquids, such as milk, beef-tea, chicken broth, &c. It is essential to give them at regular intervals, in considerable quantity, and *not to neglect them by night*.

Alcoholic stimulants are required in the great majority of cases, but they ought not to be given recklessly, the nature and quantity of the stimulant to be employed being determined by the careful consideration of each individual case. Port or sherry wine or spirits, especially brandy, answer best as a rule, and they should be given in stated doses at regular intervals, by night as well as by day. It is well to begin with a small quantity, and gradually increase this as circumstances indicate, the amount being again reduced as the symptoms improve. Stimulants are not usually required during the first few days, but in the case of the aged, the intemperate, and those who are much debilitated from any cause, they are called for at the outset. The signs which chiefly indicate the necessity for alcohol are:—1. A feeble state of the circulation, as shown by the pulse, heart's impulse and sounds, a tendency to capillary stasis, or any disposition to syncopal attacks. 2. The existence of typhoid symptoms, the amount needed being usually in proportion to the intensity of these symptoms. 3. A large amount and dark colour of the eruption, with abundant petechiæ. 4. Profuse perspiration, the other symptoms not improving. 5. Coldness of the extremities. 6. The existence of complications of a low type. On the other hand, alcohol is contra-indicated or requires to be cautiously administered should there be a very hot and dry skin; symptoms of much cerebral excitement; or conditions of the urine pointing to deficient elimination on the part of the kidneys. In all cases the propriety of continuing or increasing stimulants must be judged of by the effects produced.

General Therapeutic Treatment.—If a case of typhus is seen at an early period, many recommend the administration of an emetic. The bowels should be kept open daily by some mild aperient, or by the use of simple enemata. In order to maintain *free elimination*, it is advisable to allow the patient plenty of drink, which may contain citrate of potash, nitre, cream of tartar, or chlorate of potash. Tea, coffee, and salt are also given for this purpose. The medicines which have obtained most repute in the treatment of typhus are the dilute *mineral acids*. Nitric, hydrochloric, or a combination of these, sulphuric and phosphoric acids are those chiefly employed. They may either be made into a drink, or given in 10, 20, or 30 minim doses every three or four hours. Sulphuric acid answers best when typhoid symptoms set in. *Quinine* in moderate doses is another valuable remedy, and it may be very advantageously combined with one of the acids. *Tincture of iron* has also been highly recommended.

Various *antiseptics* have been tried, viz., carbolic acid, sulpho-carbolates, creosote, sulphites, Condy's fluid, peroxide of hydrogen, &c., but it does not appear that they are to be relied upon.

The *symptomatic treatment* in cases of typhus fever is often a matter requiring considerable attention. The symptoms which are likely to call for interference are heat of skin; nausea and vomiting; thirst; constipation or diarrhœa; and head-symptoms, viz., headache, sleeplessness, delirium, stupor or coma. For their treatment see pp. 79 to 82. Hiccup sometimes causes much distress. For its relief the best remedies are sal volatile, ether, spirits of chloroform, hydrocyanic acid, camphor, and musk, in various combinations. A sinapism may be applied over the epigastrium, or the ice-bag may be tried if necessary.

Should there be a tendency to marked prostration it is necessary to administer diffusible stimulants, such as sulphuric or chloric ether, camphor, musk, and carbonate of ammonia, along with alcohol. Sometimes patients become so low that they cannot swallow, and then recourse must be had to nutrient and stimulant enemata, which should be persevered in to the last.

It is always very important to look to the state of the bladder, and to draw off the urine if necessary. The various complications met with must also be watched for and every care taken to prevent them, especially *pulmonary complications* and *bed-sores*. As regards their treatment, it must be borne in mind that stimulants and tonics are indicated when inflammatory affections set in in the course of typhus.

Much care is requisite during the stage of convalescence, all over-exertion being avoided, as well as excessive eating. Tonics and change of air are very beneficial, It is especially necessary to guard against any sudden effort during the early period of convalescence, as this is liable to cause coagulation of blood in some of the principal veins. Any sequelæ which may arise must be attended to.

CHAPTER VI.

TYPHOID OR ENTERIC FEVER—PYTHOGENIC FEVER—ABDOMINAL TYPHUS.

ETIOLOGY.—Typhoid fever originates from a *specific poison* which is quite distinct from that causing typhus. Formerly they were looked upon as identical diseases, and a few still hold to this opinion.

There is abundant evidence to prove that typhoid is infectious, and when once it finds its way into the midst of a number of indiiduals, it tends to spread amongst them. It is most important, however, to understand clearly how the disease is conveyed. The exhalations do not appear to contain much of the contagium, and there is very little danger from merely coming into the vicinity of typhoid patients. Indeed the probability is that the malady cannot be transmitted in this way, and medical men or nurses rarely take it from attending on patients. It is in the *fæces* that the poison is chiefly contained and by their agency the disease is propagated. The atmosphere may become impregnated with the emanations from the excreta, either because the latter are thrown into some open space, or because the water-closets, privies, sewers, &c., are imperfect, and they may thus find their way into the system. *Water* is, however, the great channel by which the poison is conveyed, and numerous epidemics and endemics as well as sporadic cases of typhoid fever have been traced to some special water-supply. The materials may soak through the soil from cess-pits, or from being merely thrown on the ground, and thus obtain access into wells the water of which is used for drinking purposes; or they may find their way into cisterns through the waste-pipes. Within a recent period it has been clearly proved also that *milk* is not uncommonly the vehicle by which the typhoid poison reaches the system, either in consequence of water containing it being mixed with the milk, or from this article of diet becoming tainted in some other way with the excreta of patients suffering from the fever. Fomites may convey the disease, but only through becoming contaminated with the typhoid stools.

The name "pythogenic" has been given to typhoid fever by Dr. Murchison, who, with others, is strongly of opinion that this complaint is as a rule *spontaneously* originated in connection with ordinary sewer emanations and putrefying animal matter, and he believes that even in the specific stools the poison is always a product of decomposition.

With regard to the precise nature of the typhoid contagium, Dr. Klein has lately made careful investigations and he has discovered in connection with the intestinal lesions peculiar organisms of the nature of fungi. These organisms are of two kinds viz., minute roundish bodies of a greenish brown colour which undergo division; and micrococci, the latter being produced by the subdivision of the former. The relation of these organisms to the lesions is not conclusively proved, but the presumption is that they precede and are the cause of them.

Predisposing Causes. *Age* materially influences the occurrence of typhoid fever. It is by far most common during youth and adolescence, being very rare in young infants and persons beyond 45 or 50 years of age. Individuals under 30 are twice as liable as those over 30, and half the cases occur from 15 to 25 (Murchison). *Sex* does not seem to have any effect. Cases are most numerous during autumn, especially after a dry and hot summer. Overcrowding is not a predisposing cause, but deficient ventilation may have some influence. Typhoid attacks persons in all classes of society, and is not at all more prevalent among the poor; if anything, the contrary is the case. *Individual susceptibility* is supposed to predispose, and recent comers into an infected district are said to b most liable to be affected. Persons in good health are ofte attacked before others, and various chronic and acute diseases a well as pregnancy seem to afford some protection against typhoid

ANATOMICAL CHARACTERS.—The general condition of the body wil vary with the time at which death occurs. Usually there is muc emaciation, rigor mortis is distinct and of moderate duration, whil the excessive post-mortem congestion, rapid putrefaction, and dar colour with softening of the muscles usually met with in typhu are not observed in typhoid. The eruption is not persistent afte death, but there may be the remains of bed-sores, gangrene, erysipelas or sudamina.

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The *characteristic lesions* of enteric fever consist in *certain morbi changes in connection with Peyer's patches and the solitary glands.* According to the time at which death occurs will these present different appearances, the morbid changes being divided into stages.*

1. *Stage of deposition or enlargement.*—The first alteration is an enlargement of Peyer's patches and the solitary glands, owing t the presence of a morbid substance, supposed by some to be of th nature of a specific deposit from the blood undergoing a peculia development, but generally considered to be the result of a proliferation of the cell-elements previously existing. It is made u chiefly of granular matter and oil-globules, with a variable number of cells, having no special characters. This material is probabl first formed within the glandular sacs, but these may burst and discharge their contents into the surrounding cellular tissue, or ther may be an increase of cells here also.

It is a matter of doubt at what period the enlargement commences, and whether it is preceded by hyperæmia. Murchiso states there is no previous congestion, and that a deposit has bee met with on the 1st or 2nd day, but Trousseau gives the 4th or 5t day as the time of its appearance.

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Peyer's patches appear to be unduly prominent, being raised one or two lines or even more above the mucous membrane, and having steep edges with a smooth or granular surface: they are more or less firm, though the membrane covering them is often softened: they vary in colour from pinkish-grey to different hues of red, the mucous membrane over them being sometimes purplish, and each patch is surrounded by a vascular ring. The corresponding peritoneum is also injected. The substance seems adherent to the mucous and muscular coats. On section it appears as a soft greyish-white or pale-reddish material.

Two forms of patches are described, the *plaques molles* and the *plaques dures*, but there are gradations between them and they may coexist. The latter are more prominent and firmer, and the membrane over them is smoother and more uniform. The difference between them is that in the former the deposit is less abundant and confined to the glands, which in the latter have burst and discharged their contents (Murchison).

The *solitary glands* are not always involved. In exceptional instances they may be alone affected. They vary in size from a millet-seed to a pea, and sometimes look like pustules.

2. *Stage of softening and breaking down.*—In rare instances it appears possible for the material to be reabsorbed without any breach of surface occurring. Almost always, however, ulceration takes place, the average time at which this sets in being about the 9th or 10th day, but it may commence much earlier or later than this. The ulcer is commonly the result of the death of the patch and of the membrane over it, the whole separating as a single slough or in separate irregular portions. These sloughs are yellowish or yellowish-brown from staining, or they are sometimes discoloured by blood: they are occasionally seen in process of separation, hanging loosely. There may be mere superficial abrasion and softening of the mucous membrane preceding ulceration. Sometimes the glands simply rupture and discharge their contents giving rise to a net-like appearance, and Aitken believes this is the most frequent mode of elimination of the softened deposit.

3. *Stage of ulceration.*—The characters of *typhoid ulcers* are as follows:—In length they usually vary from a line to 1½ inch, but if several ulcers join a surface of some inches may be involved. The shape is oval or elliptical, round, or irregular, according as the ulcer corresponds to a Peyer's patch, to a solitary gland, or to several united. There is never any thickening or hardening of the edges or floor, or any morbid deposit here. The margin consists of a "well-defined fringe of mucous membrane, detached from the submucous tissue, a line or more in width, and of a purple or slate-grey colour; this is best seen when the bowel is floated in water (Murchison). The floor is formed by the submucous, muscular or peritoneal coat, and the ulcer accordingly varies in depth. Those ulcers which correspond to Peyer's patches occupy the part of the intestine most distant from the mesentery, and their long diameter is longitudinal and not transverse, as regards the direction of the intestine.

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4. *Stage of cicatrization.*—This stage commences usually about the end of the third week, but it may be delayed considerably beyond this period, the ulcers becoming chronic or atonic. Each ulcer takes about a fortnight to cicatrize. Healing is acomplished without any puckering, contraction, or constriction of the gut. A thin transparent layer of lymph forms on the surface, by which the mucous membrane becomes gradually attached to the floor from the periphery to the centre, and into which at last it passes imperceptibly. The cicatrix is slightly depressed, thinner at the centre than at the circumference, pale, smooth, and translucent. After a time the mucous membrane may become movable, and it is said villi may form, but if the glands are destroyed it is not likely that these become renewed.

The changes above described begin first, and are most extensive and most advanced in that part of the intestine in which Peyer's patches are most evident, viz., the lower portion of the ileum, and from this point they gradually extend upwards, until ultimately they may occupy the lower third of the small intestine. The extent of the disease is, however, very variable, the number of patches involved ranging from 2 or 3 to 30 or 40. Generally at a *post-mortem* examination different stages of the morbid changes are seen in different parts, being most advanced below, and it is here that the extensive ulcerations are observed. At the upper part there is usually a somewhat abrupt transition from diseased to healthy patches, and all below the first diseased patch are generally involved. The *solitary glands* are as a rule only implicated in the lower 12 inches of the gut, and they ulcerate later than the patches. They are more liable to be attacked in children.

Perforation is an event to be dreaded in connection with typhoid ulcers. It is brought about in the following ways :—1. Most frequently by molecular disintegration or an extension of ulceration, producing one or more minute, round apertures, like pin-holes. 2. By more or less extensive sloughing, involving the peritoneum, the slough separating partially or completely and leaving an opening of variable size. 3. By rupture or laceration leading to an elongated perforation, and this may happen even after cicatrization has been completed. Generally there is but one perforation, but occasionally two, three, or more are observed. In most cases the opening is in the lower portion of the ileum, but it may be higher up or in the large intestines.

If a case of typhoid fever has a very long duration, it is said that the coats of the intestine, as well as the glandular structures, become considerably atrophied.

Large Intestines.—These are usually distended with gas, and sometimes extremely so. The mucous lining may be congested or softened. Deposit and ulceration not unfrequently occur in connection with the solitary glands, these morbid changes being as a rule limited to the cœcum and ascending colon. The ulcers are generally small and circular, but may be 1½ inch long, with the long diameter transverse. In one fatal case which came under my notice, the morbid appearances were observed chiefly in the cœcum

may be excess of serum in connection with the brain and its m
branes.

SYMPTOMS. I. *Incubation stage.—The period of incubation* in typ
fever is of doubtful duration. It is most frequently over 10
and may be much longer than this. There are no distin
symptoms. Sometimes the incubation period appears to be
short if the poison is concentrated, the disease setting in
vomiting and purging, attacking a number of persons at the s
time, and giving rise to a suspicion of irritant poisoning.

II. *Actual attack.*—It is scarcely possible to divide this affec
into distinct stages. *Invasion* is ordinarily *very indefinite and gra*
and the patient cannot fix the exact date of the commencemen
the attack. Frontal headache, with giddiness and noises in
ears; general pains in the limbs with a feeling of lassitude
illness; restlessness and disturbed sleep; slight, irregular ch
diarrhœa, with loss of appetite, furred tongue, and not uncomm
nausea and vomiting, are the ordinary symptoms. Somet
there is much abdominal pain. Diarrhœa may be the only
minent symptom for some time. Occasionally repeated epis
occurs. Soon there are signs of pyrexia, increasing towards
ing. It usually happens that the patient does not feel sufficient
to take to bed for some days, but follows his occupation, and
not an uncommon event for patients to come to the hospital
having been poorly for many days, thinking there is not muc
matter with them, and they sometimes walk about during the
illness.

Murchison has seen cases in which at first the symptoms
phoid fever resembled those of ague.

The disease being established, the symptoms present durin
first week or ten days are as follows:—

The general appearance does not indicate any great prostr
and though a certain degree of this is felt, it is not very ma
The expression presents nothing peculiar, and the face is pa
a pink circumscribed flush may be noticed on one or both ch
varying in depth of tint and not constant. There is pyrexi
skin being hot and usually dry but sometimes moist, and the
accelerated to 100 or 120, and somewhat weak and soft; it
in frequency in the same patient, being readily quickened, and
generally more rapid at night. The tongue presents usually
whitish fur, is moist at first, small and pointed, red at the ti
edges, with enlarged papillæ. In exceptional cases it is larg
thickly coated; or red, smooth, and glazed. The lips are pa
and dry, and the mouth feels slimy. There is much thirst,
loss of appetite, and often nausea and vomiting.

Abdominal symptoms are prominent as a rule. These are
and tenderness, especially in the right iliac fossa; more or
tympanitic distension; gurgling on pressure in the right
fossa; and diarrhœa. Physical examination reveals enlarge
of the spleen. Sometimes intestinal hæmorrhage occurs.
diarrhœa varies in amount considerably, the stools numb
from two to twelve, twenty, or more in the twenty-four h

als of triple phosphates.

symptoms are not very marked at this time. Frontal : persists, with dizziness and buzzing in the ears. Sleep s and disturbed, but the mind is unaffected though inactive, : is no delirium even at night. Epistaxis is not an uncom- ptom.

ine presents well-marked febrile characters, urea and uric in excess, and chloride of sodium is diminished.

ntly there are slight bronchitic symptoms, with dry râles chest.

fic eruption is present in the great majority of cases, but not y. It is not unfrequently absent in very young patients ersons over 30. It first appears usually from the 7th to day, but may in rare instances be seen as early as the ot until the 20th. The abdomen, chest, and back are ons which it generally occupies, but it is occasionally on the limbs, or very rarely on the face. It does not all at once, but comes out in successive crops, each spot rom two to five days and then fading completely. The of eruption present at one time is never great, the number rarely exceeding from 12 to 20 or 30, and there may be or three. They continue to come out often until the 28th day, or sometimes even later than this. Murchison found age total duration to be about 14½ days. The eruption earlier and lasts a shorter time in children.

ters.—The eruption consists of separate spots, round, lenti- oval in shape, and varying in diameter from ½ a line to 2 They are slightly but distinctly elevated as a rule, rounded irface, with a well-defined margin, and having a soft feel. ve a pinkish or rose colour, which throughout their whole lisappears completely on pressure, and which gradually continues, and the pulse is more frequent but weaker. The tong tends to become dry and brown, or red, shining, and deeply f sured, while sordes collect on the lips and teeth, the breath havi a very disagreeable odour. Labial herpes is not uncommonly p sent. There is no diminution in the abdominal symptoms, wh indeed are often intensified, and hæmorrhage from the bowels liable to occur. The spleen also becomes larger.

The *nervous symptoms* undergo a marked change. From the 1 to the 14th day the headache and general pains cease, but there more giddiness, with deafness. At the same time the mind is fected, as indicated by more or less somnolence, mental confusi or delirium. The latter is at first only nocturnal, but may beco continuous, though it is usually worse at night, while drowsiness more marked by day. The delirium is generally of an acti noisy, and talkative kind at first, and may be very violent, t patient throwing off the bed-clothes, trying to get up constant and having various delusions. Sometimes the patient lies in apathetic state, with half-closed eyes, appearing to understa what is said and done, but unable to make intelligible repl Epistaxis is not uncommon at this time.

Sudamina often appear, usually in the third or fourth week, pecially over the chest and abdomen and on the sides of the ne Bed-sores are liable to arise in parts which are pressed upon.

The respirations become hurried and shallow, and there more marked signs of bronchial catarrh. The urine becomes m abundant, of lighter colour, and lower specific gravity; slight a minuria may arise but is not very common. Sometimes the u is retained or passed involuntarily with the stools. Rarely it tains blood, renal epithelium, or casts.

In some cases the ordinary typhoid symptoms set in, petechi the same time occasionally making their appearance, but this i exceptional course of events.

Typhoid fever when it ends in recovery presents a *gradual* s dence of the symptoms, defervescence taking place by *lysis* and by *crisis*. Convalescence makes slow progress, and is liable t retarded by a *relapse* and by complications or sequelæ.

Temperature.—Typhoid fever presents some very characte features as regards its temperature. The *ascent* is quite reg and gradual, and continues for four or five days. *The evening perature is about* 2° *higher than that of the morning, and there is a r sion each morning of about* 1° *compared with the previous evening*, so *there is a daily rise of about* 1°, and at last the evening temper comes to be from 103·5° to 104°. This mode of ascent is quite tinctive of typhoid.

The *stationary* period varies greatly in duration according t severity of the case. The temperature is usually between 104° 106° in the evenings, and only a *slight morning remission* is obse It may even reach 107° or 108°.

The *decline* is also peculiar. It takes place gradually, ar first indicated by a more distinct morning remission; in thr four days the evening temperature falls and the morning remis ome very considerable, a difference of 2°, 3°, or even more ing observed. The time taken to reach complete defervescence, that evening temperature is normal, varies much. Complica- ns and sequelæ will also lead to irregularities, and a relapse ay cause the temperature again to rise in the same regular man- r as at first.

VARIETIES.—Remarkable differences are presented by cases of phoid fever, both in their degree of severity and in the prominent mptoms which they present. There may be no abdominal or ther characteristic symptoms from first to last, and instead of diar- hœa there may be constipation throughout.

Murchison gives the following varieties:—

1. *The mild form*, under which would be included the *abortive* ariety of certain writers, which ends in the second or beginning of the third week, as well as some cases considered to be of the nature of febricula.

2. *The grave form*, which according to the prominent symptoms present is subdivided into—*inflammatory, ataxic, adynamic, irritative, abdominal, thoracic*, and *hæmorrhagic*.

3. *The insidious* or *latent form*, also called *ambulatory*, because the patient often walks about during the whole attack. Sudden death may occur in such cases from perforation or hæmorrhage.

In addition to these, there can be no doubt but that the affections named *infantile remittent fever* and *gastric* or *bilious fever* are usually merely modified typhoid.

COMPLICATIONS AND SEQUELÆ.—Affections of the respiratory or- gans are apt to occur during the course of typhoid as well as yphus; those which are more common in the former than the lat- er being *pneumonia, pleurisy*, and *acute tuberculosis*. Various other omplications mentioned under typhus are occasionally met with. hose that are specially to be dreaded in typhoid, however, are *rforation of the intestines* and *peritonitis*. The former generally ppens in the third or fourth week, but it may occur as early as e eighth day, or not until the patient is apparently almost con- lescent. It is very frequent in the *latent* variety. Usually it attended with the ordinary symptoms of perforation (to be de- ribed hereafter), but sometimes these are very obscure. *Peritoni-* may be general or local. There may or may not be prominent mptoms of this complication.

The most important *sequelæ* are phlegmasia dolens, phthisis, men- weakness, temporary general or partial paralysis, neuralgia, rrhœa, anæmia, and a general state of ill-health with debility d wasting. The last condition is due to destruction of the villi d glands of the intestines, and shrivelling of the mesenteric ands.

DURATION AND TERMINATIONS.—It is often difficult to fix accurately duration of cases of typhoid, on account of its insidious mode onset. Generally it ranges from three to four weeks, rarely ex- nding beyond the 30th day. Many cases terminate on or about e 21st or 28th day. The mean duration of fatal cases seems to about 22 days, but many run a much shorter course, and death may occur within the first few days. On the other hand the complaint may be more prolonged, and Murchison mentions an instance in which fresh spots appeared up to the 60th day. Complications and sequelæ may also protract the disease, or a *relapse*, which sometimes happens in about ten days or a fortnight after convalescence has apparently set in.

Typhoid fever may terminate in recovery, death, or a permanent state of ill-health. The average *mortality* is about 1 in 5·4 cases, but it differs in different epidemics. The *causes of death* are:—1. Gradual asthenia, or this combined with anæmia. 2. Direct loss of blood from epistaxis or intestinal hæmorrhage. 3. Poisoning of the blood from high fever, imperfect excretion, or absorption of septic matters. 4. Complications, especially perforation of the bowels or peritonitis.

PROGNOSIS.—Until a patient is quite convalescent after an attack of typhoid, it cannot be considered that all danger is past, and a guarded opinion should be given as to the ultimate result, even in the mildest cases. The *prognosis* is rather worse in females; in those advanced in years; and in persons who have come recently to an infected district. Family constitution seems to have some influence. Previous debility does not materially increase the danger.

Many of the conditions mentioned as being unfavourable in typhus are also unfavourable in typhoid, especially severe nervous symptoms and great prostration, but the pulse and tongue are not so much to be relied upon, and abundant eruption is not a bad sign in typhoid. The chief indications of danger are—severe abdominal symptoms with excessive diarrhœa; intestinal hæmorrhage, especially if profuse; signs of perforation; symptoms of peritonitis; profuse epistaxis; marked muscular tremors, the mind being clear; sudden extreme prostration; aggravation of all the symptoms after a temporary improvement in the second or third week. A relapse rarely proves fatal.

The value of the *thermometer* in prognosis requires particular notice. During the second week the temperature shows whether a case is likely to be severe or not. In mild cases a marked morning remission is observed, which begins early and increases: the evening exacerbation is late, and soon there is a permanent fall; in short the stage of defervescence sets in. In severe cases the opposite conditions are observed. The *prognosis* is unfavourable in proportion to the height of the temperature, and to the duration of this increased heat, with but slight morning remissions. Either a sudden rise or a rapid and extreme fall is a bad sign. Considerable interruption in the ordinary course of the temperature indicates the existence of complications. A marked fall often gives warning of the approach of intestinal hæmorrhage.

TREATMENT.—The remarks made with regard to the hygienic and general management of cases of typhus apply equally to typhoid, but there are some points which require special notice. Remembering the mode of origin and propagation of the poison of typhoid, every attention must be paid to the *disinfection of the stools*; to the *removal of all filth*; and especially to the *water supply*

ready described when speaking of the prevention of epi-
:s.
ıll cases the patient should take to bed from the first, and re-
there until fairly convalescent.
e greatest care is necessary as to *diet*, which should be entirely
l, nutritious, and non-irritant, and administered at stated in-
ls, but not too frequently. Milk is by far the most important
le of diet, but beef-tea, which may be thickened with arrow-
beef-juice, and custards are also serviceable. The patient
drink toast-water, barley-water, or mucilaginous liquids, and
also have tea or coffee frequently. Fruits are not to be per-
:d. This caution in diet is to be observed in all cases, but
cially when there is any reason to suspect extensive ulceration.
)roper attention to this matter many cases may be brought
y through without the administration of any medicine what-
. Much difference of opinion has been expressed as to the
oyment of *alcoholic stimulants*. It is certain, however, that
indiscriminate use may do a great deal of harm, and that
are not nearly so much needed as in typhus, or at such an
period. Often they are not at all required, and it is only in
dvanced stages, when the strength has been reduced and the
lation is feeble, that they are usually called for. Their effects
be closely watched.
ıeral acids and small doses of *quinine* are the general medicinal
dies most in repute in the treatment of typhoid, but they have
ppeared to me nearly so efficacious as in typhus.
:he majority of cases it is the *symptomatic treatment* which calls
e chief attention. The ordinary symptoms associated with
; must be treated as previously described, but a few special
rks are needed with regard to the abdominal symptoms which
o often troublesome. If there is a tendency to much pain or
ınitis it is desirable to apply heat and moisture over the sur-
)f the abdomen, assiduously and from an early period, either by
s of linseed-meal poultices or fomentations. Occasionally tur-
ıe-stupes or sinapisms are needed in order to give relief, and if
is very severe at an early period in young and plethoric pa-
, it has been recommended to apply three or four leeches over
ght iliac fossa, or a small blister. Opium or morphia inter-
may also be called for for the relief of pain.
ırrhœa ought to be checked if it is excessive or if the patient
y weak, but it is by no means always desirable to try to stop
Enemata of starch and opium are highly efficacious for this
)se. Internally the best remedies are Dover's powder, either
or with carbonate of bismuth; sulphuric acid with tincture of
n; chalk mixture or bismuth, with tincture of opium and
:able astringents. Acetate of lead, sulphate of copper, or
:e of silver may be needed in obstinate cases.
those exceptional cases which are attended with constipation,
: care must be exercised in the use of aperients. A teaspoon-
castor oil, or a simple enema every third or fourth day, is
nmended by Murchison under these circumstances.

For excessive tympanitis enemata containing turpentine o foetida answer best, in addition to the external applications a mentioned. Passing a long œsophagus-tube into the rectum times gives much relief as regards this symptom.

Intestinal hæmorrhage, if not checked by the remedies men for diarrhœa, demands full doses of tannic or gallic acid, t tine, or tincture of iron. Ice may also be given to suck cons as well as applied to the right iliac region.

Should perforation occur, or peritonitis come on from any the treatment should consist of absolute rest; the total with of food or its administration in very small quantities; and t use of opium. Should constipation ensue, on no accoun aperients be given.

Epistaxis sometimes requires the use of local styptics, or be necessary to plug the nares.

During convalescence much careful supervision is need some time, especially with regard to food and the employm purgatives. The diet must be very gradually improved, ar taken in moderate quantities. It is the more necessary to upon this, because patients are often much inclined to ind excess in all kinds of food, and do not understand why they be restricted. Wine is valuable at this time. If an aper required, a small dose of castor-oil or a simple enema answe Tonics and change of air are very beneficial in order to p recoveryand restore strength. Cod-liver oil is also useful.

It is requisite to notice certain special modes of treatmen have been advocated for typhoid fever. 1. *Antiseptic tr* Various antiseptics have been recommended, especially c acid and the sulpho-carbolates, mainly on the assumption t disease depends upon specific organisms, which might stroyed by the agency of these remedies. There is no ad proof of their usefulness. 2. *Hydropathic treatment.* On the nent, and particularly in Germany, typhoid has been exte treated by means of baths or the wet-pack. Dr. Gee, in a in the *St. Bartholomew's Hospital Reports,* has also spoken in of this plan of treatment from a hypothetical point of view. often of much service to sponge the skin, and in cases at with hyperpyrexia more vigorous measures of this kind ar cated, but there is no evidence that a routine hydropathic ment of typhoid is preferable to other methods, and the grave objections against it. 3. *Eliminatory treatment.* Som titioners, instead of endeavouring to check the diarrhœa in t encourage it by means of aperients, with the view of assist elimination of a supposed poison. This is obviously at with much danger.

CHAPTER VII.

RELAPSING FEVER. FAMINE FEVER.

ETIOLOGY.—Relapsing fever is an acute specific disease, originating in a *specific poison*, and it is highly infectious. Some suppose that it is identical with typhus fever, being merely a milder form of this malady, but unquestionably they are distinct diseases. Relapsing fever often spreads rapidly, and this happens the more readily where there is freedom of intercourse between the sick and healthy. Dr. de Zouche (*Liverpool Hospital Reports*. Vol. V.) places it next to small-pox as regards its degree of contagiousness, and observed that when it gained access into a house it usually attacked every inhabitant therein. The contagium is chiefly contained in the breath and exhalations, and, as in typhus, those who come much into contact with patients are most liable to be attacked. It may be conveyed by individuals or "fomites," and clings tenaciously to a house for months. With regard to the nature of the contagium, certain organisms named spirillæ have been found in the blood in cases of relapsing fever, during the febrile paroxysms, but they cannot be detected at the time of the crisis or in the intervals; these have been regarded as the contagium by the advocates of the germ-theory.

Predisposing causes. The anti-hygienic conditions which promote the spread of typhus have a similar influence in the case of relapsing fever, particularly want of food, overcrowding, and filth, and Murchison believes that it may be spontaneously developed, especially as the result of destitution. It prevails generally during periods of famine, and has hence been called famine-fever. This fever is most frequently met with in the British Islands, especially Ireland. A severe epidemic occurred in Liverpool a few years since. Males are attacked in larger proportion than females, and the complaint is most common between 15 and 25 years of age.

ANATOMICAL CHARACTERS.—There are no *post-mortem* appearances at all characteristic of relapsing fever. Petechiæ and jaundice are persistent if observed during life. The blood frequently contains much urea, and the white corpuscles are increased. Occasionally it is dark and fluid. The spleen is usually much enlarged during the febrile paroxysm and softened; sometimes it contains fibrinous deposits. The liver is also enlarged and congested, but neither this organ nor its duct exhibits any condition likely to account for the jaundice present. There may be signs of various morbid conditions of the nature of complications.

SYMPTOMS.—The *period of incubation* lasts from about four to ten days usually, but may be very much shorter, the attack even appearing to set in almost simultaneously with exposure in exceptional cases.

The *invasion* is remarkably sudden, the patient usually feeling perfectly well immediately before, and being able to fix upon the exact moment of attack. The first symptoms are often felt on awaking in the morning. Generally, however, there has been cc tion forsome days previously (De Zouche). The attack is cor ushered in with a severe rigor, and a sense of great we but there may be only slight shivering. Sharp frontal he is complained of at once or very soon, rapidly increa intensity, with giddiness, and pains in the back and limb exceedingly severe. After a variable time marked fever with dry pungent skin, flushed cheeks, frequent pulse, and sive thirst. In two or three days profuse and general pers follows in some cases, but gives no relief. The rigors are r at intervals and may alternate with sweating, simulatin In children the disease may commence with a "heavy Vomiting and retching are early symptoms, the vomited being yellow, yellowish-green, or green, and consisting of b gastric secretions; sometimes they are black. Epigastric ness or pain, and pain or tenderness over the liver and spl also complained of, these organs, especially the latter, be larged. Appetite is quite lost as a rule, and there is gre throughout. The tongue is at first moist and covered with or yellowish fur, and generally remains in this conditio may become dry and brown, with sordes on the teeth. It transversely fissured and red at the edges, with enlarged In bad cases patches of ulceration are observed on the tong cheeks. Constipation generally persists throughout, th being normal in colour or dark. Sore-throat is frequentl plained of, the fauces being reddened and one or both to larged.

The appearance of the patient is often quite charac "The eyes appear somewhat sunken, from the dark circl surrounds them; they are clear, but have a despairing woe- look, not easily to be forgotten if once seen. The whole presses the consciousness of pain and helplessness" (De Z More or less jaundice is observed in many cases, and sc the skin exhibits a bronzed hue. Various eruptions ha described as being met with in individual cases, but there thing of this nature at all specific.

The pulse rises rapidly to 100, 120, 140, or even 160. It full and strong, but in bad cases tends to be weak, interm irregular, the impulse and sounds of the heart being at t time feeble. The urine is febrile; it may be much dimini quantity or suppressed, and urea is often deficient. In exc cases it contains albumen. Headache continues very throughout, with a throbbing sensation, and there is mu lessness and sleeplessness. Delirium is uncommon, but sionally observed, especially towards the crisis, when it violent.

The symptoms become intensified towards the period *crisis*, which event happens in most cases on the 5th or 7th may take place at any time from the 3rd to the 10th day. are often alarming at this time and dyspnœa may be pr Crisis is almost always accompanied with profuse sweati perspiration pouring off for some hours. Sometimes sudamina appear, and occasionally watery diarrhœa or vomiting occurs. Hæmorrhages are not uncommon, especially epistaxis, and occasionally menorrhagia or hæmorrhage from the bowels. In severe cases and in weak individuals a copious and general petechial eruption is often observed at this time. The symptoms generally rapidly abate; the pulse and temperature fall even below the normal, the former frequently continuing below par; the tongue cleans; and the patient often feels quite well, only being a little weak. Most patients soon get up, and some try to work.

In exceptional cases there is not a complete cessation of symptoms, but only a partial remission. In other instances severe muscular and arthritic pains are complained of over the body generally, the metacarpal and phalangeal joints being most liable to be attacked. These prevent sleep and make the patients cry out. At this time the disease may be mistaken for acute rheumatism, especially as some of the joints occasionally become swollen. Bronchitis may set in during the intermission, with much spasmodic cough, and expectoration of viscid tenacious mucus, or even blood; it sometimes resembles hooping-cough, especially in children.

Relapse.—Occasionally no relapse occurs, especially towards the end of an epidemic, or it is scarcely noticeable. De Zouche states that he was always able to ascertain on close questioning that a relapse had taken place. It may set in any day from the 12th to the 17th, generally on the 14th. Its onset is equally sudden with the primary attack, and the symptoms are precisely the same, their intensity being, however, usually less, though they are in exceptional cases more severe. The average duration of the relapse is from three to five days, but it may vary from a few hours to seven or eight days, and it terminates by crisis, usually in the same manner as the first attack. A second, third, fourth, and even fifth relapse has been sometimes observed.

In rare instances extreme prostration suddenly comes on, with signs of collapse, the face being of a purplish colour, especially the nose, the limbs cold and livid, the pulse very feeble, and the patient becoming unconscious. In other cases there are typhoid symptoms with suppression of urine.

Temperature.—There is a continuous ascent for four or five days without any evident morning remission, the temperature reaching 104°, 105°, 106°, or even 108°. It may then remain stationary with slight morning remissions until the period of crisis, when it falls below the normal. At the relapse it again rapidly rises, and may reach even a higher point than during the first attack; it suddenly falls again at the second crisis.

COMPLICATIONS AND SEQUELÆ.—The most important are bronchitis or pneumonia; various hæmorrhages; sudden syncope; pains in the muscles and joints, occasionally with effusion into the latter; a peculiar form of ophthalmia preceded by amaurosis; diarrhœa or dysentery; œdema of the legs, due to debility and anæmia, which also causes an anæmic murmur; parotid or other buboes;

and abortion. De Zouche observed in many cases fine desquamation of the cuticle about the second week after crisis, and also falling off of the hair.

TERMINATIONS.—The great majority of cases of relapsing fever recover; in a large number collected by Murchison the mortality was only 4·75 per cent. Convalescence, however, is often tedious, and a low state of debility may be left, which may ultimately prove fatal. Death results from syncope, collapse, nervous exhaustion, excessive diarrhœa or dysentery, uterine hæmorrhage, especially after premature labour, uræmia, excessive vomiting in children, pneumonia, peritonitis, or other complications.

PROGNOSIS.—This is generally favourable, but is less so in the old, and in those lowered by disease, intemperance, or privation.

The chief signs of danger are marked jaundice; severe hæmorrhages, especially uterine; extensive petechiæ or purpuric spots; sordes and ulcerations about the tongue and mouth; incomplete defervescence after the first crisis; suppression or great diminution of urine; severe cerebral symptoms; signs of syncope; and the presence of dangerous complications. It must be remembered that serious symptoms may come on quite suddenly, even in a mild case. Convalescence is often considerably delayed on account of sequelæ.

TREATMENT.—During the first febrile paroxysm it is desirable to keep the bowels regularly open, but not to purge excessively. If the case is seen early an emetic seems to be useful. Attention must be paid to the urine, to see that excretion is properly taking place, and saline diaphoretics and diuretics may be given. A drink containing ʒ i or ʒ ij of nitre to the pint is recommended by Murchison. Cold or tepid sponging is very useful.

Opium is a most valuable remedy to relieve headache, sleeplessness, vomiting, and the severe pains present. De Zouche found hydrate of chloral of use. He only considers it desirable to moderate vomiting if it is excessive. Other symptoms must be attended to if required.

The diet should be light and nutritious as a rule, but if the patient is low a supporting diet is indicated. Stimulants are not often required, but should be given from the first if there is much debility, if an anæmic murmur is present, or if there is any tendency to syncope. They are also called for in the case of old people and young infants who cannot take the breast, and are in most cases necessary during the exhaustion following the crisis, as well as during convalescence. Complications must be treated as they arise.

During the interval the patient should be kept in bed if possible. Various remedies have been tried to prevent the relapse, but without success. Quinine in five grain doses may be given. The relapse must be treated on the same principles as the primary attack.

During convalescence good diet and tonics, especially quinine, mineral acids, and iron, are indicated. These seem to be the best remedies for the various sequelæ. Leeches and blisters behind the rs, calomel internally, and the local use of atropine are recom- ended for the ophthalmia.

Chapter VIII.

SCARLATINA—SCARLET FEVER.

IOLOGY.—Produced by a *specific poison*, scarlatina is highly in- ctious. This poison is especially abundant in connection with e epithelium which is shed from the skin, by means of which it ay be conveyed to a considerable distance. Infection may arise om merely going into the room where a patient is lying ill of carlatina, or being in the same house or even in the neighbour- ood. The apartment also frequently retains the poison lurking various parts for an indefinite time, unless it has been thoroughly isinfected, and therefore may be the means of originating the isease after a long interval. The infected epithelium-particles asily cling to clothes, letters, &c., and by the aid of these and ther "fomites," are often carried far and wide. They are also ometimes conveyed by milk and other kinds of food. It is im- ortant to remember that insusceptible individuals may dissemi- ate scarlatina far and wide, if allowed to pass from the sick room ad mingle with healthy persons. The disease has been produced y inoculation. Some believe that it may originate spontaneously, ut this is highly improbable. A second attack rarely occurs, nd still more exceptionally a third. As to the time the infection asts in a patient there is no certainty, but it is safer to consider it s beginning with the incubation-period and not ceasing until esquamation has been thoroughly completed.

Young children are chiefly attacked, from 18 months to six years f age, but especially from three to four. In addition to the im- munity afforded by a previous attack the liability to scarlatina ecidedly diminishes with advancing years. Both sexes are qually affected. The complaint is more prevalent in large towns nd among the poor. Cases are said to be most frequent in utumn, especially from September to November; there are nany exceptions to this statement however, and epidemics are but oo common at other times.

NATOMICAL CHARACTERS.—The changes found after death vary ccording to the severity of the attack and the structures involved. he ordinary anatomical characters consist of erythematous in- lammation of the skin with superficial œdema, constituting the 'rash"; more or less inflammation of the fauces; and congestion ith catarrh of the tubules of the kidney. Various complications re also frequently met with. The spleen and mesenteric glands re not uncommonly enlarged and hyperæmic. The blood is enerally deficient in fibrin and in coagulability; sometimes brin is in excess.

SYMPTOMS.—Scarlatina presents several varieties in its clinical history, but before alluding to these the typical form—*Scarlatina simplex*—will first be described.

I. *Incubation Stage.*—The *period of incubation* lasts in most cases from three to five days; it may not be longer than one or two days, or it may extend to six or eight days, but not beyond this, (Squire). Generally there are no symptoms, but the child is sometimes a little ailing, languid, and restless.

II. *Actual Attack.* 1. *Premonitory or Invasion Stage.*—The onset is usually distinct. Chilliness is felt but not severe rigors, followed by pyrexia, varying in its degree, but the temperature generally rises rapidly to 104° or more. The skin feels hot and dry, the face is flushed, and the pulse very frequent. At the same time sore throat is complained of, the fauces being reddened and dry, while the neck is stiff and tenderness is felt about the jaws. Vomiting is often a prominent symptom, with much thirst, and total loss of appetite. The tongue is usually furred and red at the tip and edges, with enlarged papillæ. Pains in the limbs, lassitude, frontal headache, and restlessness are generally present. There may be some delirium at night, and in young children scarlatina is sometimes ushered in by sudden convulsions or coma.

2. *Eruptive Stage.*—The rash generally appears on the second day, but sometimes it comes out within 12 hours, or not until the third or fourth day. Its primary seat ordinarily is the neck and upper part of the chest, but it spreads rapidly to the face and over the trunk and limbs. Sometimes it appears first on the legs. It begins as minute bright-red points, which speedily coalesce to form uniform patches of greater or less extent, so that large portions of the surface may be covered with the rash. The precise tint varies, but it is usually bright-scarlet, or of a boiled lobster or raspberry hue, though it becomes darker as the case progresses. The colour is more marked in the centre of each spot, and dissappears completely on pressure, soon returning again on the removal of the pressure, being preceded by a yellowish hue. The patches are usually very distinct in the flexures of the joints. The spots are not at all elevated as a rule, but occasionally separate ones are a little papular. The rash reaches its height usually about the fourth or fifth day from the commencement of the illness, and begins to fade from that to the sixth day, this occurring first in the parts first invaded by it. It has generally disappeared before the ninth or tenth day, and then desquamation sets in.

Sudamina are frequently present if the rash is intense, especially in adults. They are seen about the neck and chest, in the axillæ or groins, occasionally over the whole body. The skin feels dry and often in some parts rough, owing to a condition of cutis anserina. Not unfrequently the eyelids, hands, and feet are puffy. The patient experiences a sensation of heat or burning, and there may be much itching or a sense of tingling.

State of the throat.—There is more or less general redness of the fauces, with œdema and swelling. The surface is dry or covered

scid mucus, and thick opaque secretion is often seen on the
These may be slightly ulcerated or the seat of suppura-
There are the usual symptoms of sore throat, with pain and
ty of swallowing. The glands about the angles of the jaw
arged and painful, and the subcutaneous tissue is sometimes
itous and puffy. The mucous membranes of the nose and
as well as the conjunctiva are often red and inflamed.

erature usually continues to rise until the rash attains its
; then it remains stationary and subsides as the eruption
to fade, either by crisis or gradually. It ranges as a rule
04°—106° F., but may reach 107°—108° or even higher in
ional cases. There is a slight morning remission.

pulse is frequent, and may reach 120, 130, 160, or more; it
in its force, but is usually strong and full. It falls as the
ature lowers. The tongue is furred and presents a "straw-
appearance, owing to the papillæ being much enlarged
ed, projecting through the fur, and the surface may feel
As it cleans it is seen to be red, and the papillæ remain pro-
sometimes for a considerable period. Appetite is quite
it there is much thirst. The bowels are usually constipated.
r less headache continues; the patient is restless and sleep-
has some nocturnal delirium.

urine is febrile, with sediments of uric acid and urates,
as well as urea, are usually increased. Chloride of sodium
osphates are diminished in quantity. Albumen is often pre-
nd renal epithelium is visible under the microscope. Some-
he urine contains blood.

Desquamative Stage.—The symptoms subside more or less
, and then the epidermis begins to separate, the process
a very variable period, while the amount of desquamation
ffers much, being in proportion to the intensity of the rash
e number of sudamina. The skin feels dry and inelastic
desquamation commences. It begins as a rule in those
where the rash first appears. Where the skin is thin the
nis comes off in small, branny scales; in other regions it
small patches; but where the cuticle is very thick, as over the
and soles, it peels off in extensive patches, sometimes form-
nould of the fingers or hand.

ng this period the pulse and temperature frequently fall
the normal for some days. The urine is abundant and
, deficient in phosphoric acid, and contains a considerable
t of renal and vesical epithelium. The throat may remain
d the tonsils enlarged for some time.

IETIES.—Such being the ordinary course of scarlatina, it is
ant to point out the chief varieties which may be presented.

n some instances the symptoms are very trifling, the tempera-
ot being at any time higher than 101° or 102°, and only a
rash and sore throat being present, which soon disappear.
a mild form of *scarlatina simplex* or *benigna*.

carlatina Anginosa.—In this form the condition of the throat is
and gives rise to severe and prominent symptoms. There

is extensive and deep inflammation of the tissues, the redness tending to a dark hue, the tonsils and uvula being much swollen, while sticky mucus and secretion cover the surface, or sometimes diphtheritic-looking patches are visible. Ulceration then often sets in, or occasionally gangrene, which may spread extensively and involve the larynx. The glands about the jaw and the other structures of the neck swell considerably, and may suppurate or even slough to a variable extent. In some cases the salivary glands are involved. Much difficulty is experienced in opening the mouth and examining the throat, which is very painful, while swallowing is exceedingly difficult and distressing, and fluids are liable to enter the posterior nares during the act of swallowing. The breath is extremely disagreeable.

The rash is usually delayed in its appearance, is less marked or diffused, disposed to fade and return again, and its final departure is later than usual.

Often there is much swelling of the nasal mucous membrane, with offensive and irritating discharges from the nostrils or blocking up of these by secretions. The mouth and lips are also sore and cracked, and the tongue has a darker hue than in ordinary cases.

The general symptoms are prone to be of a low type, this being partly due to interference with respiration and absorption of putrid matters from the throat. When adynamia is very marked from the first, the variety is sometimes named *scarlatina anginosa maligna.*

Nausea, vomiting, diarrhœa with irritating discharges, and tympanitis may result from swallowing acrid matters.

If a case terminates in recovery, the temperature continues high after the rash has disappeared, owing to the state of the throat.

3. *Scarlatina Maligna.*—As already stated the symptoms may take on an exceedingly ataxic or malignant character in connection with a bad state of the throat, and the same thing may happen during any severe attack of scarlatina, especially if the patient is previously in a weak unhealthy condition. Nervous symptoms are prominent from the first. There is much prostration, with restlessness, insomnia, muttering delirium, followed by convulsions, stupor, or coma. The pulse is very feeble, rapid, small, and irregular; the circulation is impeded, as evidenced by duskiness of the face and capillary congestions in dependent parts, while petechiæ are frequently observed, and sometimes hæmorrhages occur. Respiration is much hurried. The tongue is dry and brown.

An important class of malignant cases are those in which there is extreme prostration from the first, with intense nervous depression, the poison seeming to act powerfully upon the nervous system. The child becomes faint and sick, is pale and cold or almost collapsed, exhibits great restlessness and anxiety, and may be delirious. The pulse is extremely rapid, weak, small, and irregular. The depression speedily increases, the face becomes very pale, livid, or mottled, and coma or convulsions set in. The breathing is quick and irregular. The skin is cold, or alternately hot and cold, and clammy perspirations break out. Death may take place efore the eruption has time to appear, or a slight irregular rash omes out if the child lives long enough.

Several cases of this character are sometimes met with in the ame family, its members being rapidly carried off one after another.

4. *Scarlatina sine eruptione.*—In some cases there is fever and a sore throat, but no eruption appears. This is liable to happen in second attacks.

5. *Latent.*—There may be no symptoms whatever, and the fact of a patient having suffered from scarlatina may be known only by desquamation of the cuticle taking place, or albuminuria and dropsy setting in.

In addition to these varieties, others have been described depending upon the characters of the eruption, such as "papulosa," "variegata," pustulosa," "pemphigoidea," &c.

COMPLICATIONS AND SEQUELÆ.—1. The most frequent and important and the one that requires special notice is *acute desquamative nephritis* and its consequences. Some look upon this as part of the disease. It is imperative in all cases of scarlatina to examine the urine at frequent intervals, even for some time after apparent convalescence. There is often a certain amount of albuminuria as in other febrile diseases, and the kidneys are always in a state of congestion and catarrh, but these conditions disappear as the fever ubsides. The renal complication generally appears during or after desquamation, and though exposure to cold seems to excite it in ome instances, as a rule it comes on quite independently of any obvious cause. It is due to the deficient action of the skin, which nvolves excessive action on the part of the kidneys, these having t the same time to remove large quantities of waste products. Probably the scarlatinal poison itself has some influence in desroying the renal epithelium. The symptoms are similar to those f ordinary acute Bright's disease, scarlatina being in fact one of he most frequent causes of this affection. The urine is diminished r suppressed, concentrated, contains more or less blood, is very lbuminous, and presents blood-corpuscles, renal epithelium, and pithelial, blood, or granular casts under the microscope. Dropsy ets in, beginning usually in the subcutaneous tissue, and it may pread rapidly, involving the serous membranes, larynx, and lungs n some cases. More or less pyrexia is usually present, and frequently vomiting, constipation, headache, and drowsiness; while here is a danger of uræmic symptoms setting in.

The symptoms may subside and disappear, or a form of chronic Bright's disease may be left. In some instances this complaint seems to commence as a chronic affection.

The remaining *complications* or *sequelæ* calling for notice are:— 2. Dropsy without albuminuria, and having no obvious cause. 3. Ulceration of the throat, either a continuation and extension of that originally present; or a new form, spreading rapidly with much sloughing, and affecting the tissues of the neck widely. Pus may ind its way into the chest, or the vessels of the neck may be opened causing fatal hæmorrhage. 4. Affections of the joints, either of a rheumatic character, or ordinary inflammation occasionally ending in suppuration or chronic disease. The inflammation is sometimes around rather than in the joints, and it may be in connection with muscles. 5. Serous inflammations with a tendency to the formation of pus, especially pleurisy and pericarditis, being usually but not necessarily dependent upon renal disease or rheumatism. 6. Bronchitis and pneumonia, and possibly phthisis. 7. Endocarditis, which it is highly probable may lead to permanent organic affections of the valves and orifices of the heart. 8. Affections of the ear. These are by no means uncommon, and include otorrhœa; inflammation of the tympanum ending in suppuration, followed by rupture of the tympanic membrane; inflammation or ulceration of the Eustachian tube, with subsequent closure and consequent deafness; necrosis of the bones, which may cause meningitis, abscess in the brain, or facial paralysis. 9. Abscesses in various parts, especially in connection with glands. 10. Gangrene occasionally. 11. Inflammation and destruction of the cornea in rare instances.

Prognosis.—The number of deaths from scarlatina varies greatly at different periods, but the mortality from this disease is considerable every year. A careful prognosis should always be given, and account must be taken of the possible complications and sequelæ. The complaint is most fatal among very young children, and in large towns. The chief circumstances which render the prognosis grave are a severe epidemic type of the disease; family predisposition to a fatal termination; great depression at an early period; typhoid symptoms at any time; late development of, or a tendency to duskiness in the eruption, especially if accompanied with petechiæ or hæmorrhages; prominent nervous symptoms; extensive sloughing or ulceration about the throat, and other severe complications of this character; renal inflammation and its results; and severe diarrhœa or vomiting. Special allusion must be made to pregnancy. The occurrence of scarlatina during this condition is extremely dangerous, and life may be destroyed in a few hours.

Treatment.—In the first place the general treatment for the prevention of infection must be carried out in every particular in cases of scarlatina, and it is always advisable to keep patients under observation, and to exercise every precaution until desquamation has entirely ceased and all chances of the development of the renal complication have passed away.

In ordinary cases but little medicinal treatment is required. The bowels should be acted upon occasionally, and some saline mixture may be administered, such as a solution of citrate of potash. Barley-water, lemonade, or iced water may be given freely as a drink, and a diet of milk and beef-tea allowed. The skin should be carefully sponged with luke-warm water twice a day, different parts being exposed in succession and then dried. Some recommend that oil and grease should be rubbed in, and others advocate the addition of a little carbolic acid, Condy's fluid, or camphor, to act as disinfectants. When the fever and rash have subsided, warm baths ought to be used about every other day, and the pa-ould be well scrubbed with carbolic acid soap, in order to of all the epithelial scales.

e of the principal conditions which call for active interfer- ill now be considered.

throat symptoms are best relieved in ordinary cases by g ice or inhaling steam. If there is much redness and swell- ese measures should be steadily persisted in, or the throat e gargled frequently with luke-warm water, if the patient is ough to do this, heat and moisture being at the same time l externally over the neck. It may possibly be advisable to a few leeches about the angles of the jaw, but very seldom. ceration and gangrene antiseptic gargles should be freely r if these cannot be employed, the application may be made orm of a spray. The best antiseptic remedies are carbolic eosote, chlorate of potash, Condy's fluid or sulphurous acid; refer chloride of lime, chlorine water, dilute hydrochloric ommon salt, or peroxide of hydrogen. It may be requisite n ulcers with nitrate of silver or its solution.

e throat is in a bad condition it is most important to attend to l treatment. Nourishing food, in the form of soups, meat s, milk, &c., as well as stimulants, especially port wine or , must be given more or less freely in proportion to the prostration of the patient, which is often considerable in ases. At the same time tincture of steel should be adminis- n full doses, alone or combined with quinine. Different ties recommend ammonia and bark, carbolic acid and carbolates, creosote, hypochlorite of soda, or the hypo- es under these circumstances. Chlorate of potash should wed freely as a drink. When the nostrils are blocked up, ere is much nasal secretion and discharge, it is well to ut the meatuses occasionally with weak disinfectant solu- r a weak solution of nitrate of silver may be required.

other conditions which are likely to call for attention are yrexia; adynamic symptoms; restlessness, sleeplessness, or n. These must be treated as in other febrile diseases.

plications and sequelæ often require special treatment, but lusion can only be made to the management of the renal n. This should be combatted by free dry cupping over the r it may even be advisable to take a little blood from the egion; hot poultices over the same region, frequently d; hot air or vapour baths, in order to excite skin action; on by means of jalap and cream of tartar; and a plentiful of diluent drinks. When the acute symptoms have sub- some preparation of iron is most valuable, especially the e; quinine is also an useful remedy.

those extremely malignant cases of scarlatina which are d with early and severe cerebral symptoms, no treatment ich avail, for they generally prove fatal. The use of a hot l-bath or cold water affusion seems likely to do most good. er may be applied to the nape of the neck, and stimulants tered by enemata.

CHAPTER IX.

RUBEOLA—MORBILLI—MEASLES.

ETIOLOGY.—Measles is decidedly infectious, especially when the eruption is out, and its contagium passes off abundantly in the exhalations of a patient, the air around being thus contaminated. It is also conveyed by "fomites." Children have taken the disease from sleeping in a bed or room previously occupied by a patient suffering from measles. Inoculation has been accomplished through the blood and secretions. A second attack very rarely occurs.

Children are most frequently affected, but those only a few months old often escape during an epidemic, while no age is exempt. Epidemics are more liable to occur during cold and damp seasons.

ANATOMICAL CHARACTERS.—The chief of these is the specific eruption, but this often disappears to a great extent after death. It is due to hyperæmia of the skin with some inflammatory exudation, and in some forms minute extravasations of blood occur. More or less bronchitis invariably sets in, but in fatal cases it is usually extensive and of the capillary variety, being associated with collapse of the lung and lobular pneumonia. Laryngitis is not unfrequently present. The blood is dark and fluid in fatal cases.

SYMPTOMS.—I. *Incubation stage.*—This generally lasts about eight days after exposure to infection. By inoculation measles has been produced in seven days. Out of 50 cases published by Dr. Squire, 45 had full rash from the tenth to the fourteenth day; in only one case was it earlier than this, and in another it was delayed to the eighteenth day. Subtracting four days from these, this will give six to fourteen days as the extremes of the incubation period. As a rule there are no symptoms during this stage.

II. *Actual Attack.*—1. *Premonitory Stage.*—Measles usually sets in somewhat suddenly, with chiliness, actual rigors, or occasionally convulsions. Then follow the ordinary symptoms of pyrexia, but not of great severity in the majority of cases, though the temperature rises rapidly to 101° or 102°, and now and then to 104°. The child is languid, irritable, and restless, or may be somewhat delirious at night. The most striking symptoms are those of so-called catarrh. The eyes are injected and watery, with a feeling of soreness and sandiness and a dislike for light, the eyelids being also red and tumefied. There is a constant irritating watery discharge from the nose, with frequent sneezing, and occasionally epistaxis takes place. A sense of tightness, fulness, or pain is experienced over the frontal sinuses. The throat is generally a little sore and red, and the voice somewhat husky or hoarse, but these symptoms are not prominent. Bronchial catarrh is indicated by a sense of tightness and uneasiness over the chest; frequent cough; quick breathing; and wheezing or dry rhonchal sounds or rhonchal fremitus. A little epigastric pain and tenderness is sometimes complained of, or even general abdominal pains, and there may be much vomiting. The bowels are generally constipated but may be relaxed.

2. *Eruptive Stage.*—The rash makes its appearance in most cases on the fourth day, but may come out from the first to the seventh or eighth. It begins usually on the face, especially on the forehead, then spreads to the trunk, and lastly to the limbs, appearing in these parts in almost distinct crops on three successive days, but occasionally it is first evident on the limbs. Commencing as small scattered red points, these enlarge to the size of a millet seed or small pea, and become perceptibly raised and papular, eventually being flattened at the summit. They are distinct to the touch and sometimes have a hard feel.

The eruption tends to form patches of a crescentic, semilunar, or irregularly circular shape. In some cases it is so abundant as to form extensive irregular but well-defined patches, almost uniformly red, but with elevations upon them; in others it is only sparsely scattered, especially on the limbs, or it may be limited to the face and upper part of the chest. The tint is variously described as rose-coloured, dark raspberry, lilac, and yellowish-red. It is more marked and brighter on exposed parts, such as the hands and face. Pressure removes it temporarily, leaving a slight yellowish hue. If the rash is very intense minute vesicles may form, and small petechial extravasations are sometimes observed. It goes on increasing for about twelve hours and then declines in the same order in which it appeared, the elevations subsiding and only a reddish or coppery discoloration remaining, the latter continuing for some time. The cuticle desquamates slightly, separating in the form of fine powdery scales, especially on the face and where the eruption has been considerable; rarely does it come off in patches. Occasionally the eruption suddenly recedes.

During the height of the rash the face and hands are often somewhat puffy and swollen. There is frequently much itchiness and irritability of the skin.

The catarrhal symptoms generally increase during the progress of the eruption to its height. The conjunctivæ and mucous membrane of the nose, mouth, and throat are more or less inflamed, and various discharges escape, or ulceration is occasionally excited. Deafness is now and then noticed, owing to the Eustachian tube being involved. The tongue is much furred, usually moist, and presents a few enlarged and red papillæ; it cleans in patches; sometimes it tends to be dry and brown. Vomiting and diarrhœa may be prominent and persistent symptoms.

The chest-symptoms and physical signs indicate more or less extensive bronchial catarrh, the cough becoming moist with muco-purulent expectoration, and rhonchal fremitus with various rhonchal sounds being perceived.

The *temperature* increases up to the height of the rash, especially during the later period, there being, according to Dr. E. Fox, a fall before the commencement of the eruptive stage. It does not

usually reach above 103°.
marked or absent. Deferv
the tenth day, as a rule by a
3°, 4°, or even 5° in 12 hour
exacerbations the temperat
below this point for a few da
ture rises to 108° or 109°. It r
influenced by complications.

The urine is febrile and a
staining: it has a peculiar odo
albuminuria and sometimes b
breath are said to have a peculia

Varieties. The *varieties* of m
vulgaris or *simplex*.—This is the
2. *Sine eruptione*.—Sometimes the
eruption. 3. *Sine catarrho*.—The
casionally even pyrexia is absen
indicated by its eruption. 4. *Gra*
nigra. This form may depend up
the unhealthy state of the patient.
mild, or they assume a virulent asp
is characterised by typhoid sympto
and irregularities in the eruption.
prostration, with a very weak, freq
extremities, a dry and brown tongu
lips. Twitchings, picking at the bed-
of a low and muttering character, o
served at a very early period. The
slightly and irregularly, often recedin
distinctly livid, purple, or black, bei
petechiæ, especially about the legs; som
place. Extensive bronchitis, pulmonary
is liable to set in. Death usually occurs
asphyxia.

Complications and Sequelæ. 1. The
the respiratory organs more especially, which
during or subsequent to the attack of me
acute laryngitis, croupous or diphtheritic; c
lary bronchitis; chronic bronchial catarrh;
ous pneumonia; catarrhal or broncho-pneum
phthisis; very rarely gangrene. 2. A low
health. 3. Acute tuberculosis. 4. Inflam
nose, or ears, tending to become chron
with discharges. 5. In tion
other parts, which ma
diarrhœa, which ma
rarely. 8. Diphthe
in exceptional instan

Prognosis.—As
favourable, but th
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Sequelæ not uncommo

MEASLES.

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d during cold and damp seasons. The chief sources of danger e the pulmonary complications. The malignant variety is necesrily exceedingly dangerous, and should recovery take place conlescence is much delayed. The sequelæ which are liable to cur after measles must be borne in mind when giving a progsis.

TREATMENT.—Decidedly the principal thing to attend to in the ajority of cases of measles is to ward off any dangerous complitions in connection with the respiratory organs. This is best rried out by keeping the patient in bed, in a room at an uniform mperature of from 60° to 65° F. according to the time of the year, to which steam from a boiling kettle may be admitted. All exsure to draughts must be carefully avoided until the entire urse of the fever has been passed through, and the bronchitic mptoms have subsided. The patient must remain quiet, and it well to darken the room somewhat. Only a liquid diet should given, but it need not be too low. The bowels must be kept gularly open by mild aperients. A mixture containing liq. amon. acetatis; vin. ipecac.; a few drops of tinct. camph. co., if the ugh is very troublesome; with mist. camph. may be admintered. If there is much oppression and sense of tightness about e chest, a sinapism or hot poultices or fomentations should be plied. Thirst is to be alleviated by ice or small quantities of id drinks. If there is much heat and discomfort about the skin, reful sponging with tepid water may be resorted to, only a mited surface being exposed at the same time. Should the bronitis become extensive, tending to involve the smaller tubes, it is st treated by giving vin. ipecac. in good doses; avoiding all iates; encouraging cough; and applying linseed-meal poulces or sinapisms freely over the chest. Local removal of blood ay now and then be indicated in plethoric children. In most of ese cases, however, stimulants are called for, such as ammonia nd chloric ether, with more or less wine or brandy and plenty liquid nourishment, administered in small quantities at frequent tervals. If signs of suffocation appear, mustard baths or warm aths with cold douching should be resorted to, as well as artiial respiration. All forms of pneumonia require a stimulant eatment.

Laryngeal symptoms should be treated by the constant applicaon of heat and moisture externally, and the use of inhalations of eam. Other complications must be attended to should they arise.

Any tendency towards the typhoid condition must be combatted by e free use of stimulants and nourishing food. If the eruption sudenly recedes, it is recommended to try to bring it out again by eans of various baths and warm drinks internally, but this must e done with caution.

During convalescence it is necessary to exercise much care for me time; to guard against colds; and in order to restore the ealth fully it is often advisable to give quinine and iron with codver oil, and to recommend change of air to a suitable climate, with cold bathing especially with salt water. The clothing must be warm, and flannel should be worn. Sequelæ not uncommonly require attention.

RÖTHELN. RUBEOLA NOTHA. GERMAN MEASLES.

It is necessary to consider briefly an affection to which the above names have been applied, the existence of which is by no means sufficiently recognised in this country.

ETIOLOGY.—Rötheln has been regarded either as a mild form of measles or scarlatina; or as a combination of these two diseases, and hence termed "hybrid measles" or "hybrid scarlatina. There is abundant proof, however, that it is quite distinct from both these complaints, though resembling them in many of its features, and that it is undoubtedly an independent *acute specific fever*, propagated by a specific contagium. Dr. Liveing believes that rötheln is far less contagious than either measles ar scarlatina, but that it is more distinctly epidemic, at least in this country, even than ordinary measles, and certainly more so than scarlatina. The contagium probably comes off in the breath and cutaneous exhalations. Adults may be attacked as well as children.

SYMPTOMS.—I. *Incubation stage*. This usually lasts about twelve days, but may extend to twenty days. There are no symptoms.

II. *Actual attack*.—1. *Invasion stage*. Rötheln is ushered in with slight shiverings, pains about the body and limbs, and pyrexia, while sore-throat is almost always complained of, which differs from that of scarlatina in being much less severe, very seldom going on to ulceration. In many cases, but not nearly so frequently as the sore-throat, signs of catarrh are present as in measles. The intensity of the symptoms is generally comparatively mild, and not uncommonly they are quite insignificant, though on the other hand they may be rather severe, the temperature running up to 103° or more in some instances.

2. *Eruptive stage*. The eruption, which is in the form of a "rash," comes out generally on the second day or even within the first 24 hours; it may be delayed, however, until the third or fourth day. Its amount is usually in proportion to the intensity of the early symptoms. It appears more or less simultaneously over the body, but is less marked on the limbs than elsewhere. At first the rash resembles that of measles, consisting of a number of minute red papules which become grouped in patches, but these are more irregular and less distinctly crescentic than those observed in measles. The colour is also rather brighter than in this disease, and it is deeper at the centre than towards the circumference of the patches. In some instances these coalesce either partially or completely, so that the skin is uniformly red over a greater or less extent of surface, and then the rash becomes more like that of scarlatina. The eruption lasts longer than that of either measles or scarlatina, its duration being never less than 4 or 5 days, and it may continue for 8 or 10 days. Slight desquama-

tion of the cuticle follows, but this is never a prominent feature, being merely of a furfuraceous character. When the rash appears the general symptoms abate considerably in most cases, but the sore-throat persists, being often the last symptom complained of and continuing sometimes for several days after the rash has disappeared.

Rötheln seems to be unattended by any particular *complications* or *sequelæ* as a rule. Slight albuminuria is not uncommon, but it soon passes away. In rare instances acute renal disease with dropsy sets in.

PROGNOSIS.—This is highly favourable, death from rötheln being an exceedingly rare event, while recovery is usually speedy and complete.

TREATMENT.—All that is needed is to keep the patient in bed; give a liquid diet; and administer an aperient if necessary, with some simple saline mixture. If the throat be very sore it may be gargled with milk and warm water.

CHAPTER XI.

VARIOLA—SMALL-POX.

ETIOLOGY.—The *specific poison* which generates small-pox is very easily conveyed from one individual to another by inoculation, contact and infection. It exists in the blood, in the contents of the eruption as well as in the substance of the dried scabs, and is also given off abundantly in the various secretions, excretions, and exhalations, especially those emanating from the lungs and skin. Inoculation can be accomplished through the blood, and very effectually through the serum, pus, or dried scabs of the eruption. Small-pox is one of the most infectious diseases, and the contagium can be conveyed to considerable distances. It is exceedingly dangerous to be in the vicinity of a patient suffering from this disease even in its mildest form, as this may induce the most virulent type. The poison clings tenaciously to "fomites," especially to clothes and other articles of a rough texture, and retains its vitality for a long period; therefore it is most dangerous to go into a room which has been occupied by a small-pox patient until this has been most thoroughly disinfected, while clothing and other articles will certainly propagate the disease unless treated in the same manner. There can be no doubt but that the disease has been not uncommonly propagated by cabs. I have known several instances in which persons suffering from mild variola have come as out-patients to hospitals, and as they may remain for some time among the other patients, it is not at all improbable that the affection is sometimes disseminated in this way.

Experiments have been made by Burdon-Sanderson and others in order to try to discover the exact nature of the contagium of small-pox, and it has been supposed to consist in certain minute particles which are present in the contents of the eruption. Klein has described peculiar organisms which he has found in connection with sheep-pox, which is identical with small-pox.

The safer conclusion as regards the time during which infection lasts is to consider it as beginning with the earliest appearance of symptoms, and continuing for some time after the eruption has disappeared. The danger is greatest during the period of suppuration. It is very important to bear in mind that the bodies of those who have died from small-pox may undoubtedly convey infection. A second attack is only rarely met with, but even a third may occur.

Variola may be met with at any age. It attacks most commonly and most severely those who have either not been vaccinated at all or only inefficiently. Constitution and race seem to influence its occurrence and characters. Some individuals resist all infection and cannot even be inoculated. The negro and dark races generally suffer severely. Dread of infection is said to act as a predisposing cause. The lower classes suffer most, for obvious reasons.

Anatomical Characters.—The eruption is the result of circumscribed inflammation of the skin, extending more or less deeply. There is first congestion, which some believe begins in the follicles of the skin. Then the papillæ enlarge, and the cells of the rete mucosum increase, thus giving rise to papules. A layer of soft whitish exudation is described as forming between the cuticle and the true skin, which is due to proliferation of the cells of the rete mucosum. Next a clear fluid collects beneath the superficial layer of the epidermis, a vesicle being thus formed, and after this pus is produced. The pustules either rupture or dry up. The true skin may be extensively involved and destroyed. Mucous surfaces are not uncommonly affected, especially the conjunctiva aud mucous membranes of the mouth, throat, and nose. Occasionally the whole extent of the respiratory or alimentary mucous tract is involved. There may be merely inflammation, or it is said the specific eruption is sometimes observed. Other mucous surfaces are also implicated, and the eruption has been described as occurring even on serous surfaces. Various organs are often inflamed, as well as serous membranes, especially the pleuræ, and the exudations are liable to be sanguineous. The heart, kidneys, liver, and muscles generally are soft and the seat of fatty degeneration. Putrefaction proceeds rapidly after death.

Symptoms.—I. *Incubation stage.*—After inoculation of the small-pox virus, the first symptoms appear in seven days. When communicated by infection the incubation period is almost always twelve days, but it may be a day or two longer or shorter. During this period there may be some feeling of general illness, but no definite symptoms are noticed.

II. *Actual attack.*—1. *Premonitory or invasion stage.*—Small-pox usually commences suddenly, with chills or repeated and well-marked rigors, followed by pyrexial symptoms, constituting the *imary fever.* The temperature rises rapidly and may reach 104° r 106° before the eruption appears. Along with the usual symp-oms of fever, which are generally severe, there are others of a ery significant character, viz., a feeling of marked uneasiness nd fulness or actual pain in the epigastrium, with nausea and nore or less obstinate vomiting; pains over the body generally, ut especially in the middle of the back opposite the lower dorsal, lumbar, and sacral regions, this pain not being aggravated y movement; and considerable debility and sense of illness, with tremulousness of the muscles. Even in mild cases it is often remarkable how prominent these symptoms are. Much headache is usually complained of, while the face is flushed and the carotids throb. In some cases the disease sets in with violent nervous symptoms, such as restlessness, delirium, somnolence, stupor, oma, or convulsions, the last being particularly frequent in children. Occasionally there is considerable sore throat or coryza. The severity of the symptoms at this period is generally in pro-ortion to that of the subsequent stages.

2. *Eruptive stage.*—The eruption appears usually during the third ay, but may be delayed until the beginning of the fourth. The ace is almost invariably its primary seat, especially the forehead, ut in rare cases it commences about the wrists. It spreads over e body and limbs in from one to two days, and is described as rming three successive crops. The number of spots or "pocks" ries from just a few to thousands, but as a rule from 100 to 300 e present. On the face they are more abundant than elsewhere. ey may be distinct or run together in different ways, thus giving e to certain varieties which will again be alluded to.

f a typical individual pock be observed it will be found to go ough the following course. It starts as a minute bright-red t, a little raised; enlarging and becoming more elevated, it orms a distinct papule on the second or third day, well-defined, tened at the top, and having a peculiar solid, hard, dense feel, npared to that of a shot or mustard-seed under the skin, which ery characteristic. This soon changes into a vesicle, a little ar thin fluid collecting in the centre under the epidermis. About fifth day a depression forms on the top of the pock, which thus omes umbilicated; at the same time the contents gradually ome purulent, this change beginning at the circumference, the tral part still for some time remaining vesicular, and this vesicle tated to be distinctly separated from the surrounding pus by a nsverse partition, so that the two portions may be severally ptied of their contents. The pus is formed by softening and uefaction of a white substance formed by an increase in the cells the rete mucosum, which finally become pus-cells. At this time istinct ring of inflammatory redness appears around each pock. e pus increases in quantity, and after a while the umbilication appears, the pock becoming either rounded or pointed at the . Its interior is divided into a variable number of areolæ or npartments, sometimes regularly arranged and of equal size, t usually irregular and unequal, the partitions being formed by the white substance already mentioned. With regard to the caus of the umbilication, it has been attributed to the passage of gland-duct or hair-follicle through the pock; or to a central o ganic connection between the epidermis and cutis, which final gives way.

About the eighth day the pustule is at its height, and has arrive at the end of the stage of maturation. Then it undergoes retr grade changes. It either ruptures, its contents being discharg and drying up so as to form a yellowish-brown scab; or it shrive and dries up without rupturing. The scab separates from t eleventh to the fourteenth day, leaving a stain of a reddish-brow colour, which remains for a variable period. If the cutis is at a destroyed a pit is left of greater or less depth, which ultimate becomes of a dead-white colour.

The course thus described is modified by circumstances whic will be alluded to presently. It is generally completed on the fa before other parts of the body.

The appearances and symptoms associated with the eruptio will vary according to its amount. If it is at all considerab there is tumefaction and puffiness of the scalp, face, neck, a other parts, accompanied with a sensation of throbbing a tightness. The eyelids may be so swollen as to be complete closed. The skin is generally of a deep-red colour between t pocks, and feels more or less sore and tender. There is usuall most uncomfortable itching, which induces patients to scratc themselves, thus causing much soreness and ultimate disfigur ment. A characteristic, unpleasant, sickly odour is exhaled fro the body.

The eruption not unfrequently involves the mucous membra of the mouth and throat, being accompanied with soreness, saliv tion, and dysphagia. There is a discharge from the nostrils, these are blocked up. Sometimes the larynx, trachea, and bronc are involved, as indicated by hoarseness, cough, and more or le dyspnœa. The urino-genital mucous membrane is often affecte causing much pain and soreness with dysuria, and sometim hæmaturia. It is said that the eruption may even be met wi in the rectum, or along the whole course of the alimentary cana but this is doubtful. Diarrhœa is not an uncommon symptom.

The conjunctiva is frequently in an irritable and inflamed co dition, and hence there is a burning sensation about the eyelid with inability to bear the light, and increased secretion of tear Occasionally a pustule forms on the ocular conjunctiva, whic may lead to ulceration and destruction of the cornea.

Secondary Fever.—When the eruption appears the primary fev abates rapidly, so that the temperature falls nearly or quite the normal in moderate cases, the patient feeling as if convale cent. When suppuration commences, however, *secondary* or *sym tomatic fever* sets in, depending upon and being in proporti to the inflammation of the skin, and subsiding as this subside It often begins with rigors or chills. The pulse is frequent, a there is much thirst, with dryness of the tongue and mouth. T temperature rises to 104° or 105° F. in a typical case, reaching its maximum when suppuration is at its height, but it may be considerably above this. Defervescence is gradual, and there may be another elevation of temperature when desiccation occurs.

The urine is febrile so long as the pyrexial condition lasts; sometimes it contains a little albumen; in bad cases blood is mixed with it.

VARIETIES.—1. *Discrete.*—In this variety the pocks are distinct and do not run into each other, though some of them may touch. They are never numerous, and there may be but a few scattered about. The symptoms are usually mild, but their severity depends upon the amount of the eruption.

2. *Confluent.*—This is a very serious form, in which the erupis abundant and the pustules run into each other. The symptoms of the invasion stage are severe, and nervous symptoms are often prominent. The eruptive stage commences earlier, and there is not is this time such a distinct remission in the fever as is observed in ordinary cases. The eruption is often preceded by erysipelas or erythema. Very numerous papules appear, small and but slightly prominent, arranged in groups or irregularly, and they rapidly spread over the whole body. The course of the eruption is more rapid than usual, the vesicular and pustular stages being soon reached. The pustules present variable appearances, but they are often extensive and flat, and there may be large bullæ filled with pus. The face is sometimes "as if covered with one bladder of matter." The contents are in some cases serous and watery or bloody and very offensive. Frequently there is no red areola around each pustule, but the skin generally is of a dark-red colour. Extensive crusts form after desiccation, often of a dark colour and soft, which do not separate for some time. Confluence is usually most evident and most serious about the scalp, face, and neck; the face may ultimately be covered with a continuous crust like a mask. The true skin is destroyed more or less, and extensive pits, scars, or seams are left, which tend to contract, thus causing great disfigurement. The eruption is generally abundant on the mucous surfaces, giving rise to the various symptoms already mentioned.

Secondary fever does not stand out so distinctly in the confluent as in the discrete variety of small-pox, and adynamic symptoms are apt to set in, with intense nervous depression. Complications and sequelæ are also very liable to arise, many of them of a serious and dangerous character. This form is exceedingly fatal, and if recovery takes place convalescence is generally very slow. Occasionally, however, cases of confluent small-pox are met with which run a remarkably favourable course.

3. *Semi-confluent* or *Coherent.*—This is an intermediate variety, in which the pocks are not quite distinct but do not actually run into each other. It is not a dangerous form.

4. *Corymbose.*—Here the eruption is arranged in clusters like bunches of grapes, and it exhibits a tendency to symmetry. It is said to be a very dangerous and fatal variety.

5. *Malignant.*—Under this term several forms which are occasionally observed may be included. In some instances an individual is attacked with severe primary fever attended with lo symptoms, and dies from the intensity of the action of the pois before the eruption can appear. Other varieties of malignan small-pox are named *black* or *hæmorrhagic; petechial; ulcerativ* and *gangrenous*; these terms sufficiently indicating their nature.

In the *hæmorrhagic* form there is intense adynamia and nervo prostration from the first, with delirium, great restlessness, somno lence, or a tendency to coma. The face is sunken and anxiou and the breathing hurried. The eruption is slow and irregular i development, sometimes receding; it tends to be livid or black and if pustules are formed they contain blood. Petechiæ are observed also between the pocks, and hæmorrhage takes place from various parts.

6. *Benigna—Verrucosa—Cornea—Horn-pock* or *Wart-pock.*—This i a mild and abortive form, in which the pocks do not become purulent, but shrivel and dry up on the fifth or sixth day. There is n secondary fever, and the duration is shorter than usual. It generally follows vaccinatiou. Another mild variety is that in which the eruption continues vesicular to the end—*crystalline-pock.*

7. *Variola sine eruptione.*—It is believed that in persons well protected there may be primary fever without the subsequent appearance of any eruption.

8. *Anomalæ.*—This term is applied to variola occuring along with other exanthemata, during pregnancy, in the fœtus, &c., and thus presenting irregularities.

There are two modifications of small-pox which call for special notice.

Inoculated Small-pox.—When the poison of variola is directly introduced by inoculation, the course of events is usually as follows:—On the second day a slight discoloration is observed at the seat of inoculation, and on the fourth or fifth day this is somewhat inflamed and irritable, a small vesicle forming, which enlarges and becomes surrounded by an inflamed areola about the seventh day. From this time to the ninth day the ordinary primary fever sets in, and in three or four days more the general eruption appears, the original vesicle having in the meantime become pustular and being now at its height, after which it undergoes retrograde changes. The important fact in connection with the inoculated disease is that in its entire course it tends to be exceedingly mild, the number of pustules being very limited. Occasionally, however, when thus originated it assumes a serious or even fatal form.

Small-pox after Vaccination—Varioloid—Varicelloid.—There can be no question as to the fact of variola being prevented or greatly modified by efficient vaccination. The principal effects of vaccination may be thus stated:—1. It sometimes prevents any eruption, there being merely a slight primary fever for three or four days. 2. It diminishes the number of pocks. In some instances there is marked fever which ushers in a slight eruption, it may be but a single pock. 3. It modifies and shortens the course of the eruption, and thus diminishes considerably the secondary fever and its accompanying dangers, as well as the destructive effects on the skin with consequent disfigurement. In some instances the eruption, even if extensive, does not go beyond the papular or vesicular stage; in others, though it becomes pustular its course is more rapid, the pustules drying up on the sixth or seventh day. Generally they are small and do not present umbilication. The unpleasant odour is usually absent. In some cases the eruption is preceded by an erythematous or roseolar rash, and it may appear first on the trunk. As the result of desiccation flat, thin crusts are formed; or hard shining scales; or occasionally little tubercles. There is either no pitting at all or this is very slight.

Complications and Sequelæ.—These are very frequent, especially in connection with the more severe forms of small-pox, the more important being.—1. Affections of the respiratory organs, viz., low forms of pneumonia; pleurisy, rapid in its progress and very dangerous; bronchitis, or inflammation of the general respiratory tract, with the formation of much thick purulent material; occasionally œdema glottidis. 2. Affections of the alimentary canal, such as severe glossitis, gastritis, enteritis, profuse diarrhœa. 3. Various local inflammations and abscesses, viz., over parts that are pressed upon; in the subcutaneous cellular tissue; or in the deep structures of the limbs; along with which may be included boils, which often come out in large numbers, and carbuncles. The pus is generally very unhealthy and sanious. 4. Gangrene of certain parts, such as the scrotum or labia. 5. Erysipelas, especially of the head and face; ecthyma, rupia, or eczema. 6. Pyæmia or septicæmia, from absorption of septic materials. 7. Affections of the organs of sense, which are not uncommonly very destructive, especially ophthalmia; ulceration of the cornea; otitis with purulent discharge, ending in caries of the bones; and destructive inflammation of the nose. 8. Urinary complications, viz., cystitis; retention and subsequent incontinence of urine; renal congestion with albuminuria and casts; or abscess of the kidney. 9. Inflammation of the ovaries or testicles. 10. Various hæmorrhages, especially hæmaturia, menorrhagia, hæmoptysis, and epistaxis, accompanied with petechiæ. 11. Peritonitis in exceptional cases.

Prognosis.—Small-pox is a very grave disease, the proportion of deaths being exceedingly high, averaging about one in three. Death may take place at any period of its course, but occurs most frequently between the eighth and thirteenth days, especially on the eleventh. The usual causes of death are high fever; adynamia; apnœa; pyæmia or septicæmia; direct loss of blood; or, at a later period, asthenia.

The chief circumstances which influence the prognosis are:—1. Age. Small-pox is very fatal in children under five years of age, and in persons who have passed middle life. From 10 to 15 is the most favourable period. 2. The hygienic conditions surrounding the patient, the prognosis being worse if these are unfavourable.

3. The previous habits and health of the patient, intemperance, debility from any cause, or any organic disease being injurious. 4. Whether satisfactory vaccination has been accomplished or not. 5. The nature and intensity of the symptoms. Among the signs of evil import are recognized a very high temperature; persistent and excessive lumbar pain; severe vomiting after the appearance of the eruption; as well as all symptoms of an adynamic or malignant character, with nervous depression. 6. The amount and characters of the eruption. The gravity of a case is in proportion to the confluence of the eruption, and to the rapidity of its extension. The corymbose variety is very fatal. Other dangerous signs in connection with the eruption are—imperfect development of the pustules or their sudden subsidence; lividity, hæmorrhage, or gangrene in connection with them; the presence of petechiæ; pallor with absence of swelling between the pustules. 7. The complications present. These materially influence the prognosis, especially those referable to the respiratory and nervous systems. Hæmorrhages are also of very serious import. Convalescence is often much delayed by complications and sequelæ. Pregnancy is a peculiarly dangerous condition if associated with small-pox. Abortion usually results, and the termination of the case is generally fatal. n some instances the eruption is observed over the fœtus. 8. Epidemic constitution. Some epidemics are comparatively mild, others very grave.

Treatment.—The indications for the treatment of small-pox may be stated as follows:—1. To pay strict attention to all hygienic conditions, and to diet. 2. To prevent a copious eruption and endeavour to make this pass through its different stages as mildly as possible, checking extensive suppuration and destruction of the skin, especially about the face. 3. To subdue excessive pyrexia. 4. To sustain the strength of the patient during the process of suppuration. 5. To treat symptoms, which are often distressing. 6. To guard as much as possible against all complications, and treat them as they arise.

1. Even in the mildest cases patients suffering from small-pox should be strictly confined to their rooms. Free ventilation is essential, and the apartment should be large and moderately cool, all carpets and curtains being removed, as well as excessive bedclothes, due care being taken to protect the patient against unnecessary draughts. Cleanliness is also most important, the linen being frequently changed and at once subjected to the action of some disinfecting agent. In the early period a low diet is called for as a rule, with plenty of cooling drinks or ice, as well as fruits, especially roasted apples, while stimulants must be avoided. Later on it is generally necessary to alter the diet gradually, and to have recourse to beef-tea, soups, jellies, &c., as well as to stimulants, the nature and quantity of these being regulated by the circumstances of each individual case. In all cases of a low type, and especially when there is much suppuration, considerable support is needed in the way of nutritious food and stimulants, and if there are indications that the patient will have to struggle through

process of suppuration, it is important not to allow the
to be much reduced, but to employ supporting measures
from the first.

management of the eruption has always naturally at-
onsiderable attention. At one time it was the custom to
tients suffering from small-pox very warm and to give
drinks, with the view of "bringing out the eruption," but
resent day the object aimed at is to limit this as much as
and to modify its course, so as to prevent the dangers of
suppuration and the subsequent pitting and disfigure-
The skin must be sponged freely with luke-warm water, to
ay be added some antiseptic, such as carbolic acid,
fluid, chlorine water, or sulphurous acid. It has been
nded to apply carbolic acid and oil freely over the sur-
this proceeding is of questionable propriety. Some con-
t the eruption is best checked by keeping the patient in a
om ; others advocate puncturing each pock as soon as pus
Many *local applications* have been made use of in order to
pitting, the chief of which are nitrate of silver, either ap-
the solid form to each pustule or brushed over the surface
tion ; mercurial plaster or ointment ; solution of corrosive
e (gr. ij ad ℥ vi) ; sulphur ointment ; tincture of iodine ;
rcha dissolved in chloroform ; and carbolic acid. Most of
very irritating and require much care in their employ-
Dr. Sansom advocates touching each pustule with carbolic
d then applying a mixture of this substance with oil of
All the pustules should not be touched at one time, but
uld be attacked on successive occasions. Mr. Marson re-
ds waiting until the pustules have discharged their con-
d then applying either olive oil, alone or mixed with lime-
r calamine ; a mixture of glycerine and rose-water ; or
am and oxide of zinc. He warns against allowing the
dry and to remain for some time on the nose and other
the face. Of course the patient must be prevented as
possible from scratching. The irritation excited by the
cretions is best relieved by frequent sponging and by the
of some absorbent powder, such as flour, starch, hair-
or calamine. If there is much eruption on the scalp it is
y at an early period to cut the hair very short, or even to
e head.

most cases pyrexia is kept within limits by sponging the
l by the administration of cooling drinks, with a diapho-
ine mixture. A brisk purgative is advisable at the outset,
bowels should be kept freely open afterwards. If there is
cy to hyperpyrexia large doses of quinine seem to answer
his disease. Venesection is never called for.

ring the suppurative stage tonics are needed, such as
iron, or mineral acids with decoction of bark. If there
namic symptoms these remedies must be given freely,
ith ammonia, camphor, &c., and plenty of nourishing food
ulants.

5. The chief symptoms which may require to be treate
miting or diarrhœa; restlessness, sleeplessness, or deliriu
ness of the throat; and hæmorrhages. It is recommended
morphia for one or two nights, in order to get the patient
habit of sleeping. Caution must be exercised in the adr
tion of narcotics if there is much bronchial catarrh or sa
Delirium in small-pox is frequently an indication for the
of stimulants. Physical restraint may be required, and b
sometimes derived from the use of the warm bath. Sor
is best relieved by the use of some mild gargle, or by sucl
frequently, or taking a little currant jelly. Hæmorrhages
the administration of full doses of tincture of steel, tannic
acid, turpentine, or ergot of rye, separately or some of
combination. Retention or suppression of urine is said t
sometimes, but in the Small-pox Hospital it has never be
to give any trouble. The catheter must be employed sh
urine be retained.

6. The complications which it is specially necessary t
against and to be on the look out for, are those connected
respiratory organs and eyes, and various abscesses. In
tions usually call for a stimulating plan of treatment, and
any removal of blood required; occasionally it may be a
to apply a few leeches. If there is bronchitis, the patient
encouraged to cough frequently. All abscesses should be
opened. Should there be any purulent discharge particul
tion is required as regards cleanliness.

In order to prevent complications connected with the ey
recommended to apply cold water constantly, or to use con
of a weak solution of corrosive sublimate (gr. i ad ℥ vi).
either of these arise a supporting treatment is indicated.
ter over the temple often does good if there is much conju
Marson recommends the use of poppy-fomentations with al
may be necessary to touch an ulcer of the cornea with a
stick or solution of nitrate of silver. A green shade sh
worn.

Special methods for the treatment of small-pox hav
brought forward, but the only one that deserves notice
treatment by *antiseptics*. On the whole the balance of
seems to be in favour of the internal administration of thes
dies, but some have not found them so valuable as oth
there is decidedly no unanimity of opinion as to which antis
is best to employ. Different observers advocate the admini
of carbolic acid, sulpho-carbolates, sulphurous acid, sulph
hypochlorites. At the same time tonics, such as quinine
may be given.

During convalescence good diet and tonics are require
cod-liver oil is often very useful. As soon as the patient
fit condition warm baths should be employed, carbolic soap
freely used.

Preventive Treatment.—The rules for preventing the spr
contagious diseases should be rigidly carried out in the

small-pox. Patients who have suffered from this disease must not be allowed to mingle with healthy persons until they are quite convalescent and have been well disinfected. Rooms which have been occupied by such patients, as well as clothing worn by them, must also be thoroughly cleansed and disinfected. Any articles used for cleansing the skin, such as pieces of sponge or rags, should be immediately destroyed. The great prophylactic against small-pox, however, is *satisfactory vaccination* and *re-vaccination*, as will be pointed out in the next chapter. Inoculation with variolous virus has been practised with the view of producing a mild type of the disease, but this is only justifiable under certain rare circumstances, viz., when small-pox breaks out among a lot of people in a confined space and no vaccine matter can be obtained, *e.g.* on board ship out at sea.

Chapter XII.

VACCINIA—COW-POX.

Etiology.—Vaccinia is an acute specific disease, originating from a *specific virus*. In the cow, especially the milch cow, it occurs as a natural malady, either sporadic or epizootic, running a definite course, and attended with the formation of a vesicular eruption near the udder and on the body of the teats, In the human being it is only induced by direct inoculation, either of the matter taken from the cow, or of that conveyed from one individual to another. Many believe that vaccinia is identical in its nature with variola, only modified by its occurrence in another animal, and there have been many observations and experiments which seem to support this notion.

Methods of Vaccination and Precautions to be Observed.—The great majority of practitioners vaccinate with lymph taken from the human being, but some advocate that it should be obtained immediately from the cow. There seems to be positive proof that the lymph does not deteriorate or lose its protective power after passing through any number of individuals. The matter should, if possible, be inoculated when fresh, being inserted directly from arm to arm. Often, however, this is not practicable, and the lymph has to be collected in glass tubes, on ivory points, or on little plates of glass, and used subsequently. It has been recommended to mix the lymph in a watch glass with twice its quantity of pure glycerine and water, and preserve this mixture in capillary tubes, which is said to be equally effective. The matter should always be taken from a perfectly healthy child; from thoroughly characteristic vesicles; on the eighth day. Several punctures are to be made on the summit of each vesicle, so that no blood may be mixed with the lymph, and all pressure must be avoided, only such fluid as escapes spontaneously being made use of. If dried lymph is employed for vaccinating, it has to be rendered liquid by mixing it with a very minute quantity of water.

Vaccination ought to be performed when children are very young, *i.e.*, from six weeks to three months old, provided other circumstances are favourable. It is most important that they should be in good health at the time, especially that they are free from skin affections and acute disorders, such as diarrhœa. If small-pox is in the neighbourhood, however, vaccination should be performed under any circumstances and at the earliest age, even immediately after birth should there be great risk. If children are weakly and there is no urgency, vaccination may be delayed for a year or two. Of course no age is too late for vaccinating, if this has not been satisfactorily done previously. When vaccination is unsuccessful it should be repeated after a short interval.

The part selected for inoculation is the outside of the arm over the insertion of the deltoid muscle, the skin being made tense. The chief methods of performing the operation, which should be always carried out thoroughly and carefully, are as follows:—1. By a single or double puncture with a sharp lancet well charged with the lymph, this being introduced obliquely under the cuticle into the cutis, so as to make a valvular aperture; the instrument should be left in for a few seconds, and as it is removed the seat of puncture must be compressed. Several special instruments have been invented for this operation. 2. By making a number of minute superficial punctures, or "tattooing" as it is termed, and then applying the lymph with the flat surface of the lancet. 3. By first rubbing in the lymph, then tearing up the cuticle with the lancet over a surface equal to about the area of a sixpenny piece, and finally rubbing in more lymph. Two such patches are sufficient. 4. By scratching the cuticle and thus producing superficial scarification, the lymph being then applied. Some employ single long scratches, distant half an inch to an inch from each other; the best plan, however, is to make a number of fine parallel scratches over a small area, and others may be made across these. Scarifiers have been invented for this purpose, but the ordinary lancet answers very well. 5. By abrasion of the cuticle with the edge of the lancet, used as an eraser is used to remove blots from paper. 6. By vesication, liquor ammoniæ being applied, and then the cuticle rubbed off and the vaccine matter applied.

When the surface over which vaccination is performed is small, as in the case of puncture or limited scarification, it is necessary to inoculate in at least five points in the same arm at distances of about half an inch apart, or in three places on each arm.

Revived lymph may either be inserted directly by means of the lancet; or, if it is on ivory points, these may be introduced into punctures or rubbed on scarified surfaces.

Phenomena following Vaccination.—At the end of the second or beginning of the third day little papular elevations are visible over the points of inoculation, with slight redness around. The elevation and redness increase, and by the fifth or sixth day distinct vesicles form. These are round or oval, bluish-white, raised at

gin, and depressed in the centre. At the close of the
or beginning of the eighth day a circular inflamed areola
ound each vesicle. The latter continues to enlarge during
th day, when it is in its most perfect state, being full, tense,
and much raised at the margin, and presenting a pearly
nd lustre with translucency. The contents appear clear
htly viscid, but minute active particles are visible under
wers of the microscope, which are supposed by Dr. Beale
rticles of bioplasm to which the lymph owes its active pro-

reola continues to extend for a couple of days, reaching a
r of one to three inches, and being accompanied with more
induration and swelling; sometimes small vesicles form
On the tenth or eleventh day it begins to fade, and at
time the contents of the vesicle become opaque, while it
and becomes brown in the centre, by the fourteenth or
day a hard reddish-brown scab being formed. This
in colour, shrivels, and falls off from the twenty-first to the
ifth day, leaving a permanent scar. A typical cicatrix
be circular, white, not less than one-third of an inch in
, depressed, with minute pits or foveolæ over its base.
es there are radiations from the centre.
ppearances and course above described may be modified
in obvious circumstances, or without any evident cause.
me of the methods of vaccination the vesicles are compound
ps. In adults they do not usually present thoroughly typi-
acters, on account of the structure of the skin, while their
often retarded and the areola is more diffused. Retar-
r acceleration of the course is sometimes observed, without
ious cause. In some cases an entirely irregular and spu-
m of eruption is met with. This is generally due either to
r lymph having been used; to the child being in an un-
condition; or to mechanical irritation; but occasionally it
e thus explained.
irregularities are observed when the lymph is taken imme-
rom the cow. "Papulation is deferred till the seventh,
inth, or tenth day, and the areola is not complete till from
nth to the fourteenth or sixteenth day, being also harder,
said to revive and decline, continuing to exhibit a brick-
urplish hue while the hardness remains. The vesicles are
ot more developed than those produced by ordinary lymph.
ion is prolonged, and the crust is often retained till the
r fifth week."
in local and constitutional symptoms usually accompany
lopment of the vaccine vesicles. There is itching, heat,
and pain in the arm at the time of maturation, with a feel-
iffness and difficulty in movement. Occasionally erythema
pelas breaks out, or the vesicles may ulcerate or slough.
nds in the axilla are often enlarged and tender, especially
s. There is no primary fever, but a symptomatic fever
during the process of maturation, and it is said the tem-

perature may reach 104°. At this time the child is fretful and restless, and the alimentary canal is often deranged. In rare instances severe symptoms are met with, which may prove dangerous, especially in weakly children. A general rash is sometimes observed, of a roseolar, lichenous, or vesicular character, which does not usually last beyond a week. These eruptions are more common after vaccination direct from the cow.

RE-VACCINATION.—This is often required in consequence of the primary vaccination having been insufficient or imperfect, as indicated by deficient number or non-typical characters of the cicatrices. But even when the original vaccination has been in every way satisfactory, it is desirable to re-vaccinate after puberty. Some recommend that the operation should be performed every seven years, but this appears quite unnecessary, and one efficient re-vaccination may be considered as affording perfect protection. The same precautions and care are required as in the case of primary vaccination.

Results of Re-vaccination.—In some cases there is no effect, especially in children. On the other hand now and then a perfectly typical course is observed, chiefly in adults. Usually the course and characters of the eruption are much modified. It appears earlier; reaches its height by the fifth or sixth day; being either papular, or in the form of an acuminated vesicle, with an indurated, diffused, and irregular areola. A small scab forms by the eighth day, which soon falls off. There is generally much local irritation, and constitutional symptoms are usually much more marked than in primary vaccination. Erysipelas is liable to occur, and occasionaliy fatal pyæmia sets in. I have known a patient sink rapidly after re-vaccination, without any obvious cause.

REMOTE EFFECTS OF VACCINATION.—There cannot be the slightest doubt in the mind of any unprejudiced observer with regard to the powerfully protective influence of vaccination against the ravages of small-pox. In a large proportion of cases, if vaccination has been thoroughly and efficiently performed, and especially after revaccination, there is absolute and complete protection against this malady. But even when it is not entirely prevented, the disease manifests itself only in a slight and modified form, is scarcely attended with any danger, and does not leave behind the hideous disfigurement which it produces if allowed to proceed unchecked. Epidemics have been much less frequent and severe since the introduction of the practice of vaccination, and this result has been in direct proportion to the efficiency of the measures which have been put in force to ensure general and successful vaccination. This has been observed in every part of the world and among all races. It is very important to bear in mind that in proportion to the number and typical characters of the vaccination marks will this immunity from small-pox be more certain.

It has been stated that certain affections are transmitted by vaccination, especially cutaneous diseases, scrofula, and syphilis. There is no reliable evidence that this happens to any extent, but cases have been brought forward by Mr. Hutchinson and others which indicate that such a result does occasionally occur, and in order to guard against the mere possibility of this evil, it is necessary to pay strict attention to the precautions already alluded to, and especially to see that the vaccine lymph is taken from a perfectly healthy child.

TREATMENT.—All that is generally required is to protect the arm from irritation, and prevent the vesicles from being scratched. If there is much subsequent inflammation, wet lint, lead lotion, or poultices may be applied.

During the fever it is well to keep the child in-doors, and to give some mild aperient. Unusual complications, such as erysipelas, may call for special treatment.

CHAPTER XIII.

VARICELLA—CHICKEN-POX.

ETIOLOGY.—Varicella has been supposed to be merely a modified form of variola, but the evidence is conclusive that they are perfectly distinct diseases. It is decidedly an infectious complaint, and may be transmitted either with or without direct contact. It is doubtful whether it can be inoculated, but probably not. Occasionally this affection assumes an epidemic form. A second attack is never met with. Varicella is only observed in children as a rule, but now and then affects adult females.

SYMPTOMS.—I. *Incubation stage.*—The ordinary duration of the *period of incubation* is twelve days, but it may range from ten to sixteen days. There are no symptoms.

II. *Actual attack.*—1. *Premonitory* or *Invasion stage.*—Frequently this stage is absent, the first symptoms being simultaneous with the appearance of the eruption. In other cases this is preceded for twenty-four to thirty-six hours by slight pyrexia, with headache and sometimes cough.

2. *Eruptive stage.*—The eruption is rarely delayed beyond twenty-four to thirty-six hours at the most, there being at first but a few spots, but fresh crops appear during four or five nights, often in considerable numbers, and they may continue to come out for ten or twelve days. They are quite distinct as a rule, but occasionally a few are confluent. They are first seen usually on the body, especially about and between the shoulders and over the chest. Afterwards they extend to the limbs, while the scalp is often much affected, but the face is generally only slightly involved, though the eruption is cometimes abundant here. Some authors have described the eruption as being vesicular from the first. In most cases, however, it begins as bright-red spots, slightly papular, not at all hard, and disappearing on pressure. Within a few hours these become vesicular, a clear fluid collecting under the epidermis. The vesicles are of good size, round or oval, ill-defined,

not umbilicated or divided into spaces, so that when punctured they collapse completely. There is no inflammatory areola. The appearance is described as being in some instances, "as if the patient had been subjected to a shower of scalding water." In about twenty-four hours the contents of the vesicles become slightly and uniformly opalescent, and a faint red areola appears. Each vesicle either ruptures or dries up from the third to the fifth day, a small scab rapidly extending from the centre to the margin. Thi is generally thin and crumbly, coming away in particles, but occasionally a thick coherent crust is formed. It separates in abo four or five days usually. As the skin is not deeply involved c destroyed, only a slight redness is left, which soon disappears, an there is no pitting as a rule; in exceptional instances, howeve distinct pits are left, which are round or elliptical, smooth an shining. Owing to the development of successive crops, vesicl are seen side by side in different stages of their progress. Th only subjective sensation which attends the eruption is that of itch ness, which may be considerable. A faint peculiar odour is said t be given off.

The general symptoms are very slight in most cases, there bein only a little feverishness. Sometimes there are rather severe ex cerbations of fever during the night. Catarrh is frequently pr sent, and may be dangerous. In some cases the patient remai in an unsatisfactory state of health for some time after an attack o varicella.

A number of *varieties* of varicella have been described, but the are of no importance, and most of them are really modifications o small-pox.

PROGNOSIS.—Death never occurs as the result of varicella, an therefore the prognosis is highly satisfactory.

TREATMENT.—Nothing is required but to keep the patient quie give mild diet, and see that the bowels are freely opened, Chi dren must be prevented from scratching themselves. Catarrh mu be attended to if present, and should there be much fever a salin mixture is useful. Quinine may be administered during conva lescence.

CHAPTER XIV.

ERYSIPELAS—THE ROSE—ST. ANTHONY'S FIRE.

ETIOLOGY.—Only that form of erysipelas which occurs as an *ac* *idiopathic* disease is considered in this work, the *traumatic* variet being described in surgical treatises. Undoubtedly this is *acute specific disease*, and though its contagious nature is denied some authorities, there is ample evidence to prove that it is an fectious complaint, and that it is capable of being transmitted fr one individual to another, especially when several persons are collected together, as in hospitals. I have met with several instances corroborative of this statement. Sometimes also the affection assumes an epidemic form. The poison is given off into the atmosphere, and may likewise be conveyed by fomites, as well as by direct contact or inoculation. There is reason to believe further, that erysipelas may by infection originate a group of certain allied diseases, such as puerperal fever or hospital gangrene, and *vice versa*. This is one of the affections in the propagation of which bacteria have been supposed to be concerned.

Though capable of being conveyed by infection, on the other hand many cases of erysipelas are met with in which the origin of the attack cannot be thus explained. Indeed, not unfrequently no obvious *exciting cause* can be discovered, while in some instances it is attributed to local exposure to undue cold or heat; general exposure to cold and wet; very slight injury; irritation of bad teeth; errors in diet, especially the use of shell-fish and such articles; and violent mental emotion.

Among the more important *predisposing causes* of erysipelas are:—1. Age, the disease being most common in newly-born infants and in persons from twenty to forty years old. 2. The female sex, especially during menstruation. 3. Individual and family predisposition. 4. The occurrence of previous attacks, erysipelas differing from most other acute specific fevers in this respect. 5. Certain conditions of the system, viz., plethora; the condition induced by intemperance or debilitating diseases, as well as that associated with gout or renal disease; or any low febrile state. 6 Certain local conditions, such as various forms of injury, or the presence of dropsy in a part. 7. A warm season.

Anatomical Characters.—Erysipelas is characterised by a diffuse inflammation of the skin, the subcutaneous cellular tissue being also generally involved, and sometimes the deeper structures. At first there is hyperæmic redness, varying in tint, followed by vesication of the skin and by serous infiltration of the areolar tissue, which causes more or less swelling. In severe cases pus may form under the cuticle, in the subcutaneous tissue, or in the deep tissues. There is no tendency to the formation of lymph, so that the inflammatory process is not limited by adhesions, and any pus formed is liable to be of a low type. Occasionally it terminates in ulceration or gangrene, especially when the tissues affected are in a low state of vitality, as when they are the seat of dropsy. The neighbouring lymphatic glands and vessels are always affected, while the veins leading from the erysipelatous part are also inflamed in many cases, and may contain pus. Bacteria have been described as being present in abundance in the tissues towards which erysipelatous inflammation is advancing.

In fatal cases the blood is often dark and liquid, and does not coagulate firmly. The various organs are congested, especially the lungs, or they are sometimes inflamed. The small vessels of the lungs and head frequently contain pus. Little emboli, composed of white corpuscles or albuminoid masses, have been found in the small vessels of the grey matter of the brain by Bastian and others.

The mucous and serous tissues may be the seat of erysipelatous inflammation, as well as the cutaneous structures.

SYMPTOMS.—After an incubation period which is said to range generally between ten and fourteen days, but which may extend to three weeks, an attack of erysipelas is in most cases, but not invariably, ushered in by premonitory symptoms of a general character. There is a feeling of illness, with general uneasiness or muscular pains, disturbance of the digestive organs, sore-throat, headache, restlessness and other signs of nervous disorder, with a certain degree of pyrexia. Some shivering or chilliness may be felt at the outset, but usually no marked rigors are experienced until the local inflammation is about being or has been developed. These symptoms may last from a few hours to four or five days before the characteristic signs of erysipelas appear, but generally the latter are evident within two or three days. Epistaxis occasionally occurs at the outset.

The local signs of erysipelas are as follows:—At first there is a feeling of heat, irritation, and tightness, the skin is tender to the touch and has a stinging or smarting sensation. Soon the part affected becomes red, swollen, firm, tense, and shining, at the same time all the painful sensations being aggravated and there being increased thermometric heat. Sometimes the swelling precedes the redness.

The inflammation starts from one spot and generally extends chiefly in some particular direction, but sometimes spreads in all directions equally. There is a well-marked boundary-line between the advancing inflammation and the healthy skin, as shown by the difference in colour and by the abrupt termination of the swelling, but only a gradual transition is observed at that border where the process is subsiding.

The hue of the redness varies, but it tends to become darker as the case advances. The swelling is much greater where abundant loose cellular tissue exists, and is then often irregular in form and unequal in consistence, while it pits on pressure. In structures which are tense, unyielding, and closely attached, such as those of the scalp, the sensations are far more painful than in lax tissues.

In slight cases the inflammation subsides, being followed by desquamation of the cuticle; far more commonly, however, vesicles of various sizes form on the surface of the skin, which contain a yellowish serum, and in serious cases large irregular bullæ or bladders are raised. These burst and discharge their contents, often leaving crusts which on separating may disclose superficial ulceration. The cuticle always peels off extensively. Occasionally signs of more or less suppuration, ulceration, or moist gangrene are observed, and these processes may lead to great destruction of tissue.

The seat and extent of the inflammation vary in different cases. Idiopathic erysipelas is most common about the head and face, and it generally begins about the nose, ear, angle of the mouth, lower eyelid, or cheek. Dr. Reynolds has observed that it usually starts at the point where the skin is undergoing transition into a mucous membrane. It tends to spread rapidly, so that the whole face, scalp, and neck may be speedily affected, and there is very great swelling, the features being obliterated, the eyelids closed, the nostrils blocked up, while deafness is often complained of. Not unfrequently abscesses form, especially in the cheeks or eyelids. The erysipelas is prone to extend to the mouth and fauces, and may even reach the larynx. There is also danger of meningitis.

In some instances the limbs are affected, especially the legs, and now and then the trunk. I have met with two cases of erysipelas involving the whole of both legs, complicating acute rheumatism. Some local irritation may determine the locality of an erysipelatous inflammation.

The time taken by erysipelatous inflammation in running its course varies, but the redness and swelling generally attain their height on the second or third day. Different parts of the surface are seen in different stages of advancement. After it has apparently stopped the inflammation may again spread, and *relapses* are by no means uncommon. In some cases it is *erratic* or wandering in its progress, and may be *metastatic*.

Usually the absorbent glands and vessels in the neighbourhood show signs of irritation, being enlarged, painful, and tender, sometimes very much so, and they may be affected first. Suppuration takes place in exceptional cases.

The general symptoms usually increase with the onset of the local inflammation. Ordinarily they merely indicate more or less pyrexia. The pulse rises to 100 or 120, and is full and strong. The temperature ascends rapidly at the outset, and may attain a height of 104° or 105° on the first evening of the eruption. Usually the maximum is reached on the third day, but it increases so long as the inflammation advances, and may attain to 106° or 108°. As a rule there are distinct evening exacerbations, but the evening temperature may be 2°, 4°, or even 5° lower than that of the morning (Reynolds). Defervescence sets in in favourable cases about the fifth or sixth day of the eruption, and the temperature rapidly falls, becoming normal in from twelve to thirty-six hours. It may, however, remain high for a much longer time, and defervescence is then less critical. These observations apply chiefly to *facial erysipelas*, for great deviations as regards temperature are met with when it attacks other parts. Any relapse or extension of inflammation is indicated by a rise in temperature, which may be noticed before there are any external signs. Complications will also influence the temperature. The urine is febrile. Urea is increased and chlorides are diminished. Albumen is frequently present.

In *facial erysipelas* there is considerable restlessness, with, in many instances, mental wandering or actual delirium, especially at night, quite apart from any cerebral complication. The tongue always tends to become dry and brownish, and in all cases of a low type it assumes distinctly adynamic characters, with sordes on the lips and teeth, the pulse becoming very rapid and feeble, and other typhoid symptoms also setting in. This course of events is likewise apt to occur in very feeble and intemperate persons, and in the aged.

The *complications* to be feared are cerebral or spinal meningitis; bronchitis; intestinal catarrh; and renal congestion or inflammation. As already mentioned, erysipelas may spread to the throat or larynx, or may involve serous membranes.

Varieties.—Several varieties of erysipelas are described, founded on the intensity, mode of progress, appearances, and terminations of the local changes. The chief of these are:—1. *Simple* or *cutaneous*. 2. *Erratic* or *migratory*. 3. *Metastatic*. 4. *Miliary*. 5. *Phlyctenous*. The last two are named from the size of the vesicles or blebs. 6. *Œdematous*, where there is much œdema. 7. *Phlegmonous* or *cellulo-cutaneous*, in which the deep tissues are extensively involved and tend to suppurate. 8. *Gangrenous*. Varieties are also named according to the part affected, *e.g.*, *facial*, *scrotal*, &c.

The *erratic* form usually presents less hyperæmia and swelling than usual, and the pyrexia is not so severe, while considerable and rapid changes in temperature are observed. It tends to run a protracted course, and occurs chiefly in the old, or in those suffering from gout, rheumatism, or kidney disease.

Prognosis.—Erysipelas is always a serious disease, and a cautious prognosis should be given in all cases, but especially when it attacks the scalp or face. The principal circumstances which increase the danger of any individual case are as follows:—1. The patient being very young or advanced in age. 2. A low condition of the system, especially that due to intemperance. 3. The presence of organic disease, particularly renal disease with dropsy. 4. The complaint being epidemic, much depending on the type of the epidemic. 5. Any tendency to typhoid symptoms or signs of blood-poisoning. 6. Severe cerebral symptoms, particularly if they point to meningitis. 7. Extension of the inflammation to the throat or larynx. 8. A dark colour of the eruption or the appearance of livid vesicles. 9. Any disposition to involve the deep tissues extensively, or to end in suppuration or gangrene. 10. Sudden disappearance of the eruption, with symptoms of some internal part being attacked.

Treatment.—*General.*—Unquestionably all lowering measures are to be avoided in the management of erysipelas, and a supporting treatment is that which gives the best results. A nutritious diet is necessary from the first, with cooling drinks, and in most cases stimulants are called for at an early period, not uncommonly considerable quantities being required during the progress of the disease.

The patient should, if possible, be isolated and placed in a comfortable, well ventilated but not draughty apartment, and every attention must be paid to hygienic measures.

The bowels should be kept well opened by saline aperients. The most reliable medicinal remedy in erysipelas is tincture of steel, in doses of 30 to 40 minims every three or four hours. In adynamic ases quinine or ammonia and bark may be given, along with al- oholic stimulants. It is often necessary to administer opium, hloral, or some other narcotic at night.

Local.—Ordinarily it will be found best to cover the erysipelatous part with cotton-wool, having previously powdered it over with flour or a mixture of starch and oxide of zinc. When the face is affected a kind of mask may be made, with apertures corresponding to the mouth and eyes. Among the numerous local applications recommended by different practitioners, the most important are collodion or a mixture of collodion and castor oil; nitrate of silver, either in the form of the solid stick or solution; and solution of carbolic acid. In some cases there is great pain, and then warm fomentations containing opium or belladonna are serviceable, the surface being afterwards dried and covered with wool. Nitrate of silver is often used in order to check the progress of erysipelas, the stick being rubbed into the skin a little beyond the advancing margin of the inflammation. This appears to succeed sometimes. Suppuration calls for free incisions, and in the phlegmonous variety scarification is of great value.

Various symptoms may require attention in erysipelas, as well as complications, especially meningitis and extension of the inflammation to the throat or larynx. The treatment of these conditions will be considered in their respective chapters, but it may be mentioned that if there is much œdema about the glottis it may be requisite to scarify the part or even to perform laryngotomy.

In order to prevent the spread of erysipelas, it is imperative upon those who are attending cases, especially medical men and nurses, to exercise every precaution against conveying the disease to others, particularly if they have to come into contact with parturient women, or with persons suffering from wounds or ulcers.

CHAPTER XV.

DIPHTHERIA.

TIOLOGY.—Unquestionably diphtheria is an independent *acute speci- c disease*, and is ordinarily produced by a *specific poison*, it being a ighly infectious complaint, not unfrequently assuming a severe pidemic form. The contagium is believed by some to be asso- iated only or chiefly with the peculiar deposit which forms on the roat and other parts, and it has been asserted that this material ust be brought into contact with a mucous membrane or an braded cutaneous surface before the complaint can be trans- itted; there is strong reason to believe, however, that the con- gium is given off in the breath, and is also probably contained in e various excretions. The disease may spread through a house, ut there is always more danger of infection in the case of those ho are brought into close contact with a patient suffering from it, and who therefore inhale the breath or are liable to have the morbid products coughed out upon them. Infection lasts for an uncertain time after convalescence. The affection is more liable to be propagated if there is much discharge, as from the nose, especially if cleanliness is not attended to. The poison clings tenaciously to houses and rooms for a considerable period, and may be conveyed by fomites. It is a matter of doubt whether diphtheria can be originated by inoculation with the deposit. The same individual may be attacked more than once.

Some believe there is a sporadic form of this disease, which is not contagious but is produced by unfavourable hygienic conditions, especially by drainage emanations. Cases have come under my notice which certainly seem to bear out this belief.

The *predisposing causes* of diphtheria are the period of childhood; individual and family susceptibility; bodily fatigue or exhaustion; and nervous excitability. Anti-hygienic conditions do not seem to increase the frequency of the contagious form. Hot and dry climates and seasons appear to favour the development of the poison-germs.

ANATOMICAL CHARACTERS.—A peculiar inflammation of the fauces, attended with the deposit of patches of exudation, constitutes the ordinary local manifestation of diphtheria. At first there is redness, which may begin in any part of the throat, with swelling and increased secretion of viscid mucus. The redness spreads over the entire mucous surface, and then the exudation makes its appearance. The deposit may commence at any spot, such as on one of the tonsils, on the soft palate, or at the back of the fauces, and may start from one or several points, there being at first only small specks, which extend and coalesce so as often to form extensive patches, or even to cover uniformly the entire surface. The patches have a variable thickness, and they become thicker by successive layers being formed underneath. The characters of the lymph vary much. The colour is usually grey, white, or slightly yellowish; it may be brownish or blackish. The consistence ranges "from cream to wash-leather." The material resembles in some cases wet parchment, or damp and dirty wash-leather. On removing it, which is effected with more or less difficulty, a raw bleeding surface is left, or sometimes a distinct ulcer, which is again speedily covered by fresh deposit, the exudation forming in the substance of as well as upon the mucous membrane, thus causing its superficial destruction. The under surface of a patch may present little spots of blood. If the exudation separates of itself, it is either not renewed at all or only in thinner films. There is occasionally considerable ulceration or sloughing of the soft palate, uvula, or tonsils; or abscesses may form.

The deposit may spread from the throat to the mouth, lips, nose, conjunctiva, larynx, trachea, or bronchi, even to their finest ramifications; rarely to the œsophagus, stomach, intestines, and gall-bladder. Occasionally it starts primarily in some of of these parts. It has also been observed over the vagina and rectum. Any raw cutaneous surface is liable to be affected.

Microscopically the material consists chiefly of epithelial and granular cells, with molecular granules of fat and protein. Sometimes fibres and disintegrated tissues are visible. Vegetable growths have been observed, but they are not always present, and similar organisms are met with in other products. Chemically it chiefly resembles fibrin.

The lymphatic glands in the neighbourhood are enlarged and inflamed, especially those near the angles of the jaw. Should there be much ulceration or gangrene, there is general swelling of the neck, owing to infiltration of the tissues with serum or lymph.

In fatal cases the various organs are found to be much congested. The spleen and lympathic glands generally are enlarged. The lungs are in many cases the seat of acute insufflation, collapse, lobar or lobular pneumonia, or sometimes of apoplexy. The kidneys may show signs of parenchymatous inflammation. Fibrinous coagula are frequently observed in the cavities of the heart, extending into the great vessels.

SYMPTOMS.—Diphtheria is essentially a general disease with local lesions. Hence it is usually ushered in by general or constitutional symptoms, followed by local symptoms referable to the throat or to other parts which may become involved. Along with these local symptoms the general disturbance is increased, and may become extremely severe, while the disease is liable to be followed by a peculiar nervous disorder.

The *period of incubation* in diphtheria is usually from two to four days (Squire). It may range from thirty hours to eight days, or perhaps even longer than this. The invasion is generally gradual, there being a feeling of illness and languor, more or less weakness and depression, often with chilliness, anorexia, nausea, diarrhœa, headache, drowsiness, with some pyrexia. At the same time there may be some stiffness of the neck, tenderness about the angles of the jaw, or slight sore throat.

The symptoms of the developed disease vary considerably in character and severity, and it is important to notice that the gravity of the constitutional disorder bears no necessary relation to the throat symptoms. Sir W. Jenner has arranged cases of diphtheria into groups, which, however, are not absolutely distinct but often run into each other.

1. *Mild Form.*—Here there are slight throat symptoms, and on examination signs of more or less inflammation with exudation are seen. The glands about the angles of the jaw are a little swollen and tender. Pyrexia is mild and of short duration, but the temperature may rise considerably. The urine is not albuminous. Occasionally extensive deposit on the throat is observed while the general symptoms are scarcely perceptible. Recovery is rapid and complete, and no sequelæ follow the attack.

2. *Inflammatory Form.*—After premonitory symptoms there is high pyrexia, the patient at the same time feeling very ill and weak. The pulse soon tends to become feeble. Throat symptoms are prominent, examination revealing signs of much inflammation,

followed by the deposit of exudation in from twelve to forty-eight hours, which possesses some consistence and toughness. This may be coughed up in pieces of false membrane of variable size. The disease is liable to spread to the larynx, thus giving rise to dangerous laryngeal symptoms and serious interference with respiration. The glands of the neck are much enlarged. The urine is febrile, but also frequently contains much albumen as well as some granular casts.

3. *Insidious Form.*—Without any particular general disturbance and only slight sore throat, laryngeal symptoms suddenly set in with severity, and may lead to speedy suffocation.

4. *Nasal Form.*—There is at first a sanious discharge from the nose, with low fever. Soon the throat is seen to be red and swollen, and fluid escapes through the posterior nares, while the glands about the angle of the jaw swell considerably. The discharge may be very fœtid. Afterwards the deposit may form on the pharynx or larynx, the latter being sometimes unexpectedly attacked; or the symptoms may subside.

5. *Primary Laryngeal Form.*—This is characterised by the exudation starting in the larynx and spreading to the pharynx. Laryngeal symptoms are therefore prominent from the first.

6. *Asthenic Form.*—In this class of cases the general symptoms are of a low type, either from the outset or subsequent to the usual symptoms of diphtheria. The sense of illness and prostration becomes very great; the complexion is dirty-looking and opaque, and the skin generally may assume a dirty-yellowish tint, having also a peculiar feverish pungency, though the temperature is not high. The pulse tends to be very frequent, small, weak, and irregular, and the heart's action is greatly enfeebled. The tongue becomes dry and brown, and sordes form on the lips and teeth. Ultimately the ordinary typhoid symptoms set in, with delirium and other nervous phenomena, and the patient sinks.

The above symptoms may or may not be associated with much deposit over the throat or larynx, but this is of a soft pulpy kind, and hence the local symptoms are often not proportionately severe. They are not uncommon in the nasal variety. It is in these cases that extensive ulceration and sloughing are chiefly met with, the symptoms being chiefly due to toxæmia resulting from absorption of the decomposing matters into the blood. The breath is then very fœtid, and there is great swelling about the neck.

COMPLICATIONS AND SEQUELÆ.—Albuminuria is of very frequent occurrence during the course of diphtheria, and the quantity of albumen passed is sometimes extreme. Fibrinous casts may be present at the same time, and also more or less blood. These conditions may be associated with morbid changes in the kidneys, especially in the epithelium lining the tubes, but the relation of this condition to the general disease is not determined. Occasionally the urine is suppressed. Hæmorrhages from the nose, throat, air-passages, and other parts are not uncommon in bad cases, and there may be purpuric spots on the skin. An erythematous or erysipelatous rash is occasionally observed. Pulmonary complications are not equent, especially if the respiratory passages are involved, :—acute distension of the lungs, the vesicles sometimes giving y; pulmonary collapse; lobar or lobular pneumonia; and pulnary apoplexy.

Diphtheria is liable to be followed by important *sequelæ.* In me cases the progress towards convalescence is very slow, and a ite of marked debility and anæmia remains for some time. The ost remarkable series of sequelæ, however, are those connected ith the nervous system. They may follow the mildest attack, but e more frequent and more marked in severe cases. Generally a eriod of apparent convalescence intervenes, the duration of which aries from a few days to some weeks, but the symptoms appear in ost cases within three weeks.

The precise nature, extent, and intensity of the nervous disrder vary in different cases, but the phenomena observed generally point to paralysis, motor and sensory. In some instances hey are localised, especially in connection with the pharynx and alate, so that the voice is altered and swallowing is performed vith difficulty, which condition may last for a considerable time. True *diphtheritic paralysis*, however, is characterised by being more or less progressive, attacking different parts in succession, so that ultimately the whole body may be implicated. It starts usually in the throat and palate, the voice becoming snuffling or inarticulate; while deglutition is difficult, and fluids are apt to pass into the nares, solids giving rise to a choking sensation, with violent irregular action of the muscles. At the same time the mucous nembrane is more or less deficient in sensibility. The tongue, ips, and cheeks may then become involved. Vision is apt to become suddenly impaired from paralysis of the ciliary muscle, the ower of adjusting the eye being lost; at the same time the iris affected, and there may be squinting. The limbs are then liable be attacked, there being at first tingling and numbness in the igers and toes, with impairment of touch, which spreads upards, power at the same time becoming diminished, so that at last e patient has no control over the voluntary movements and cant stand or move. After a time the muscles waste and become bby. The head sometimes rolls from side to side, owing to ralysis of its supporting muscles. The bladder may be involved, ving rise to retention of urine: or there is constipation, owing to e abdominal muscles being affected. In some cases great danr arises from the respiratory muscles being attacked, so that eathing cannot be carried on. Serious symptoms may also arise m implication of the heart, its beats becoming very infrequent, ing sometimes reduced to 16 per minute, as well as slow and ak, and finally the organ may entirely cease to act.

Abnormal sensations are often complained of in various parts, well as hyperæsthesia and tenderness. Intense neuralgia somees follows diphtheria.

The duration of these symptoms varies much. Usually the ternation is favourable, provided the respiratory muscles and heart e not involved.

Duration and Terminations.—The duration of diphtheria ranges from two to fourteen days, but its complications and sequelæ may prolong it greatly. Relapses also are not very uncommon. Death is a very frequent event, especially in some epidemics. The chief causes of death are:—1. Suffocation, owing to the larynx being implicated, which is most frequent in children, and generally happens within the first week. 2. Gradual asthenia, most common beyond the age of puberty and after the first week. 3. Septicæmia. 4. Uræmia. 5. Secondary nervous disturbance. This is very fatal in children, but death does not take place from this cause after two months. Occasionally patients attacked with diphtheria die within a few hours, apparently killed by the virulence of the poison. Sudden death has happened in several instances, which has been attributed to syncope, or to the formation of a fibrinous coagulum in the heart or in one of the great vessels.

Prognosis.—Always grave, the prognosis of diphtheria is worse in children than adults. The chief signs of danger are—implication of the larynx, with consequent interference with respiration; great discharge from the nares; epistaxis; repeated vomiting or diarrhœa; a very rapid and feeble pulse, or a very infrequent pulse; symptoms of adynamia, especially if accompanied with delirium; suppression of urine; signs of uræmia; the presence of albumen, blood, or casts in the urine, particularly if these are abundant; a sudden rise in temperature. Even mild cases may prove fatal from asthenia; or the nervous sequelæ may set in and cause death.

Treatment.—The management of cases of diphtheria must depend very much on their type and intensity, but even the mildest case needs to be carefully watched in its progress, so as to be prepared for any untoward course of events. It cannot be too strongly enforced that there is no specific remedy for this disease, and that the measures to be adopted must be guided by the circumstances of each individual case. It may be further remarked that lowering measures are not well borne, a more or less supporting treatment being always indicated for diphtheria.

The patient must in all cases remain in bed, the room being kept at a good uniform temperature, and all hygienic conditions being duly observed, especially as regards cleanliness and proper ventilation.

In a severe case it is important that the air of the room should be maintained at a temperature of 65° to 68°, and kept moist with steam, by allowing a kettle with a long spout to be continually boiling, or by boiling water in an open vessel over a spirit lamp. Children should have a tent made over their cribs by means of curtains or blankets, and the steam be conducted within this by the aid of an elastic tube fixed on the spout of the kettle. Disinfectants may be employed about the apartment, and every precaution must be taken against the spread of the disease.

It is the practice with some to commence the treatment of all cases, if seen at an early period, by administering an emetic;

ive a strong purgative. The advantage of such measures
ver, very questionable.

tacks of a mild nature it is sufficient to open the bowels;
me saline mixture, with a good quantity of beef-tea and
and employ soothing local remedies, viz., warm poultices or
tions over the throat, and some simple gargle.

ses which are at all severe the *general treatment* demands
ttention. In the first place nutritious diet should be given
ie outset, including plenty of milk and beef-tea. The pa-
ould also take cool drinks freely, and suck small lumps of
equent intervals. If there are any signs of depression con-
le nutriment is called for. Alcoholic stimulants are not
d at first in most cases, but they must be given as soon as
any indication that the powers of the system are failing.
e often needed in large quantities in adynamic cases, and
bear them well. The best stimulant ordinarily is brandy,
f which may be administered beaten up with eggs. Iced
gne is also very valuable. If a patient cannot or will not
, it is highly important to administer food and stimulants,
as medicines, by means of enemata.

gards medicinal treatment, a mild aperient may be given
day, so as to keep the bowels open. A saline drink, or
re one containing chlorate of potash, is decidedly useful.
st valuable medicine in most cases of diphtheria is tincture
which should be administered in full doses every two or
urs. It may be beneficially combined with quinine. Dr.
commends iodide of potassium (gr. ij to iv) with chlorate
h (gr. v to x) every two or three hours. Others employ
c medicines. Should adynamic or typhoid symptoms set
onia and bark, camphor, ether, musk, and such remedies
d for.

treatment in connection with the throat is of essential im-
when exudation has formed, chiefly with the view of
ng its extension. On no account must the membranous
be torn off, though some high authorities, including Trous-
ave advocated this measure. Topical applications are
or, and may be made either by means of gargles; inhala-
he throat-brush; atomised spray; or by blowing in pow-
ough a straw or quill. The latter methods are especially
the case of children. It must be acknowledged that there
lerable difficulty in deciding what applications answer best,
t authorities who have had extensive experience in diph-
iffering much in their opinions on this subject. There is
eason to believe, however, that benefit is derived from the
ertain powerful remedies, which are applied by means of
h. Those most employed are solution of nitrate of silver;
ydrochloric acid; tincture of steel or liquor ferri perchlo-
h glycerine in equal parts. Some recommend the repeated
ion of one or other of these; but it is better to follow the
ocated by Sir W. Jenner, viz., of making one thorough and
application, around as well as over the patches. He ad-

vises that a solution of caustic (℈i to ℥i of water) should be used, the surface around the exudation being touched with the solid stick; or a mixture of equal parts of hydrochloric acid and water.

Gargles are valuable if the patient is old enough to use them, the most serviceable being one containing tincture of iron and glycerine, or a solution of chlorate of potash. Solution of phosphate of soda has been recommended with the view of dissolving the false membrane. Antiseptic gargles are also often very serviceable, such as one of carbolic acid, Condy's fluid, or hypochlorite of soda, particularly if there is any tendency to gangrene or ulceration, when solid caustic must also be freely applied. The use of sulphurous acid spray, applied by means of the atomizer, has been found very efficacious. The plan of blowing in powders has also been commended, a mixture of alum and sugar, as well as tannin having been employed in this way. When there is discharge from the nose, this should be frequently washed out by means of antiseptic injections through the nostrils; while applications may be made to the posterior nares from the throat.

There has also been much controversy as to the treatment which should be adopted when the larynx is involved. If the difficulty of breathing is only moderate, relief may be afforded by giving an emetic, by means of which some exudation may be got rid of. Paroxysmal dyspnœa may also be relieved by chloroform or ether. Should there be, however, evidence of considerable obstruction to the breathing, the exudation continuing to increase, the only possible thing to be done is to perform *tracheotomy* or *laryngotomy*, the former being applicable for children, the latter for adults. Sir W. Jenner urges that the trachea should be opened as high up as possible, and recommends that the edges of the wound be touched with caustic. The utmost precautions must be taken after the operation to prevent inflammation of the respiratory organs. The tubes must also be kept properly cleansed. The results of the operation are almost always temporary relief and prolongation of life; ultimately the issue is very frequently fatal, still cases do recover sometimes when apparently almost hopeless.

Dr. B. W. Richardson has recorded a case, (*Medical Times and Gazette*, July 17th, 1875), in which the employment of artificial respiration, by means of the double-acting bellows, was efficacious in saving the life of a patient when *in extremis*, after tracheotomy had been performed.

Symptoms or complications may need attention in diphtheria. It is important to look to the urine, and should there be any signs of suppression, poultices and fomentations should be freely applied over the loins, or dry cupping may be employed.

In order to hasten convalescence, change of air is most useful, especially to the sea-side. Good diet is also essential, with tonics and cod-liver oil. For the nervous sequelæ, the best remedies are quinine and iron, or strychnine, with a supporting and nutritious diet, including stimulants, Blistering the nape of the neck is sometimes beneficial. Galvanism may be employed in connection with paralysed parts.

CHAPTER XVI.

MUMPS. IDIOPATHIC PAROTITIS.

—Mumps is probably an *acute specific disease*, and there is son to believe that it is infectious. Almost always the assumes an epidemic form, but it may be localised in institutions where a number of young persons are aggre- ther. It rarely occurs except in young individuals, being non about puberty, and also from five to seven years of les are much more frequently attacked than females are most prevalent in spring and autumn.

CAL CHARACTERS.—Mumps is chiefly characterized ana- by inflammation of one or both parotid glands. Some ts are of opinion that the process begins in the cellular ch pervades the gland-tissues; others that a catarrh of ducts first occurs. The affected gland is hyperæmic and being infiltrated with a serous fluid. Fibrinous exuda- often observed, and a most important point to notice is, is extremely rarely any tendency to the formation of pus. s around are more or less infiltrated. As a rule the ıpidly subsides and the gland returns to its normal con- 'ccasionally the submaxillary gland is involved, and the other parts may be the seat of metastatic inflammation.

s.—The *period of incubation* for mumps is from fourteen two days. In most cases there is some premonitory ch lasts from one to three days before local symptoms ested, but occasionally they come on simultaneously. ia usually continues throughout the attack, but may ı the appearance of the local signs, and it is seldom r does the patient feel particularly ill. A swelling or pears in the region of either parotid gland, commencin the external ear and then extending up to the zygoma s to a variable extent over the face and down the neck, ıg rise to much disfigurement. It has an elastic feel, ıer over the centre than at the circumference. The skin ddened over it, but is frequently unaltered. More or less neasiness is felt, with a sense of tension, increased by he mouth, masticating, or swallowing; there is also s on pressure. Salivation occurs now and then, and lly deafness is complained of. In the great majority of swelling subsides about the fifth or sixth day, and has ppeared in two or three days more; but in the meantime l on the opposite side frequently becomes affected and ugh a similar course, or both may be involved at the e. A hardness occasionally remains for some time; and xceptional instances abscesses form in the gland, which rnally or into the external meatus. The submaxillary sometimes attacked, and the surrounding lymphatic s well as the tonsils, are often enlarged.

An important character of this disease is its liability to *m* *stasis*, especially in adults. This may be preceded by so dangerous symptoms. The testicle is most frequently attack orchitis setting in as the inflammation subsides in the parotid, w effusion into the tunica vaginalis and œdema of the scrotu Occasionally the parotid and testicle are affected at the same ti or alternately for several times in succession. The orchitis gen ally runs a favourable course, but it may lead to wasting of t testicle. In females the labia, mammary gland, or ovary may attacked in the same way. Meningitis has been stated to ha occurred in very rare instances.

Treatment.—In most cases but little treatment is required. is necessary to keep the patient indoors in a comfortable room, even in bed if the case is at all severe. An aperient is useful the outset, and the bowels should be kept regularly open. Sali medicines may be given, so as to promote the action of the sl and kidneys; and during convalescence quinine is advisable. T diet should consist of liquids, especially milk and beef tea. T only local treatment generally needed is to use hot fomentatio and cover the part with cotton-wool. The application of a lee or two may possibly be required. If an abscess forms it must opened, and any hardness that is left may be removed by fricti with oil or by painting with tincture of iodine. When metasta takes place it is recommended to endeavour to excite the return inflammation in the parotid by means of mustard poultices or b ters. Orchitis must be treated by rest and fomentations.

Chapter XVII.

HOOPING-COUGH—PERTUSSIS.

Etiology.—Hooping-cough is generally regarded as an infect disease, depending upon a *specific poison*, which may travel a c siderable distance through the atmosphere, or be conveyed fomites. It is chiefly given off in the breath. The disease c monly occurs in an epidemic form, but may be sporadic. It n be communicated by infection before the characteristic "hc is developed. A second attack is scarcely ever observed.

The chief *predisposing causes* are childhood, especially after second year; a cold and damp season or climate; and expo to all causes of "cold."

Anatomical Characters and Pathology.—Most authorities gard hooping-cough as a peculiar catarrh of the mucous m brane of the air-passages, attended with hyperæsthesia; ot think that it is either entirely or partly due to some morbid co tion in connection with the vagus nerve. There may be evide of catarrh in fatal cases, but frequently these are absent. T dvocate the nervous origin of the disease have described ances of inflammation about the vagus nerves; enlarged ial glands pressing upon them; or congestion of the me- blongata and its membranes. In most cases, however, none e conditions are observed. The most important morbid con- associated with hooping-cough are those which are of the of complications, viz., bronchial catarrh; lobular collapse of ngs; acute insufflation or emphysema; dilatation of the ii; and catarrhal pneumonia. Rarely croup or meningitis e present.

PTOMS.—The *period of incubation* for hooping-cough is uncer- ut Dr. Squire has found evidence of the disease as early as wo to four days after exposure to infection. The symptoms vided into certain stages.

t or *Catarrhal stage*. At the commencement there are no teristic signs, there being merely pyrexia, which is often accompanied with signs of catarrh, viz., running from the sneezing, redness of the eyes, frequent and usually severe ysms of cough, at first dry but soon attended with a peculiar oration. This stage may last from two days to two or three or more, and in proportion to its duration and severity will y be the duration and intensity of the entire disease.

nd or *Spasmodic stage*. The fully established disease is cha- ised by peculiar fits of spasmodic cough. A paroxysm gene- ets in abruptly without any obvious cause, being in many preceded by a sensation of tickling in the throat, or some npleasant feeling. The cough is very severe and distress- onsisting of a number of short, quick, spasmodic or con- and forcible expiratory puffs, followed by a prolonged, shrill inspiratory sound or "hoop," these alternating for a le number of times; if the fit is of very long duration, the at last becomes almost inaudible. It is usually terminated expectoration of a considerable quantity of thick, viscid, uid, which may also be discharged through the nose, and commonly vomiting takes place. Breathing being inter- vith, the child presents the appearances due to non-aëration lood and venous congestion, and in prolonged attacks may almost asphyxiated. Usually there is a feeling of much tion with soreness about the muscles of the chest after a sm, but these soon pass away. As accidental occurrences ay be bleeding from the eyes, nose, mouth, ears, or rectum; tary discharge of urine and fæces; hernia or prolapsus ani; ulsions. Physical examination of the chest during a fit re- hat air does not enter the lungs properly. The physical f pulmonary complications can often be detected.

frequency and duration of the paroxysms vary greatly, the ing generally in proportion to the other. As a rule the becomes intensified up to a certain point, attaining its at about the end of the third, fourth, or fifth week, and then es gradually.

ng the intervals the patient is usually apparently well, but in severe cases there may be prolonged exhaustion, languor and debility, loss of appetite, headache, sleeplessness, pyrexia, and other symptoms; or various complications may give rise to their special clinical phenomena.

Third or *Decline stage.* There is no sudden transition to this stage, but a gradual diminution in the frequency and intensity of the fits, while the cough loses its special characters, and expectoration becomes more easy, the sputa being opaque and muco-purulent like those of ordinary bronchial catarrh. At the same time vomiting ceases and the health improves. Finally the cough stops altogether and the patient is convalescent.

COMPLICATIONS AND SEQUELÆ.—Some of these are directly due to the cough, others are accidental. The chief are bronchitis, which may become capillary; lobular collapse; emphysema or insufflation; rupture of air-vesicles, with subcutaneous emphysema; catarrhal pneumonia; pleurisy; phthisis; acute tuberculosis; croup; convulsions; cerebral apoplexy; meningitis; hernia; gastritis or enteritis, with obstinate vomiting and diarrhœa; other specific diseases.

DURATION AND TERMINATIONS.—The duration of hooping-cough is very variable, but from six to eight weeks is stated to be the average. The third stage may continue for an indefinite period, and a *relapse* is not uncommon. Most cases terminate in recovery, but death is not an uncommon event, being occasionally due to the severity of the disease, but usually to complications. Some permanent organic mischief is often left behind, or the chest may become deformed.

PROGNOSIS.—Hooping-cough is always a serious disease and call for a guarded prognosis. The general circumstances which increase its gravity are very early age; dentition; constitution debility; residence in a large town; poverty and its cons quences; and epidemic prevalence. The complaint is more da gerous in proportion to the number and severity of the paroxysm the degree of pyrexia; and the gravity of the complications pr sent.

TREATMENT.—Numerous specific remedies have been broug forward for the treatment of hooping-cough, but they all fail most cases, the disease running its course unchecked, though may be mitigated in its severity. The chief indications are—1. T prevent or subdue the paroxysms of cough, at the same time ca being taken that there is no accumulation of secretion in the bro chial tubes. 2. To obviate all complications and treat them they arise. 3. To attend to the general health and to the state the secretions.

It should be a constant rule in the case of children to pay ir mediate attention to any chest symptoms, and this applies to t early period of hooping-cough. The patient should be kept in warm room, be well clad in flannel, and have warm drinks order to promote perspiration. An aperient may be given, a a mixture containing liq. ammon. acet., and vin. ipecac. should b administered.

e second stage the most important remedies are sedatives
:ispasmodics, for the purpose of allaying the paroxysms of
These must be given in minute doses, and their effects
watched. The most efficient are belladonna, in the form of
:, extract, powdered leaves or root; opium, syrup of pop-
morphia; hydrocyanic acid; conium; hyoscyamus; tinc-
lobelia; cannabis indica; ether; chloroform; valerian;
The alkaline carbonates are believed to be useful, and
of them may be combined with one of the above remedies.
:xperience I have found most benefit from a mixture of vin.
and hydrocyanic acid (♏. ¼ to ♏. ½); or from tincture of
ınna. Some advocate inhalation of chloroform or ether.

he various specific remedies advocated the chief are alum
is in some cases decidedly valuable); dilute mineral acids,
.lly nitric; cochineal; arsenic; nux vomica or strychnine;
e of potassium or ammonium; infusion of clover; and re-
emetics. The last are useful if there is any tendency to
ılation of secretion in the bronchi. Metallic salts, viz.,
f copper, zinc, iron, and silver, have been recommended by
authorities, and may be useful in those cases which tend to
: chronic. Inhalations of carbolic acid have been recently
.ted.

.l applications have been tried, viz., touching the larynx
strong solution of nitrate of silver; counter-irritation to the
r along the vagus nerve; friction with opium, belladonna,
ıer liniments over the chest; and the application of a bella-
plaster. They are of doubtful benefit.

general management is important. In bad weather a child
ıg from hooping-cough should be confined to the house alto-
or even to one room maintained at an uniform tempera-
ɔut in favourable seasons it is decidedly beneficial for the
to be out in the fresh air during the warmer part of the
The clothing must be sufficiently warm. It is important
nd to the diet, and to the state of the alimentary canal;
dentition be proceeding the teeth must be looked to. Chil-
ho have sufficient intelligence may be taught to suppress un-
ıry cough as much as possible.

plications must be watched for and treated as soon as they
Inflammatory affections do not bear lowering measures
hooping-cough and supporting treatment is needed.

ng convalescence tonic remedies, especially iron and qui-
re useful. Change of air is also found to be most beneficial
onged cases, or a sea-voyage. Good diet is needed, with a
ine. There is no protection against hooping-cough, except
oval from the source of infection.

Chapter XVIII.

INFLUENZA—EPIDEMIC CATARRH.

Etiology.—Influenza is essentially an epidemic disease, and usually attacks a large number of persons, either simultaneously or in rapid succession. Often it breaks out in several parts of a district at the same time. It generally progresses in a certain direction, and is said to have a cyclical course; frequently, however, it prevails over a very large area. The inhabitants of large towns are chiefly affected, especially in those parts which are low, damp, over-crowded, and in other unfavourable hygienic conditions. Sometimes the disease breaks out even at sea. It is very prone to influence the characters of other affections.

The exciting cause of influenza is believed to be a *specific poison*, which is conveyed only by the atmosphere. The nature of this is doubtful. Most authorities regard the complaint as being infectious; others consider it to be of malarial origin and non-infectious. Inoculation cannot be effected. .Various hypotheses have been advanced to explain the occurrence of epidemics, but none of them are satisfactory. They break out at all seasons, but sudden changes of temperature are said to favour their development.

The chief individual *predisposing causes* are the female sex slightly; adult and advanced age; a low condition of the system; exposure to cold; and, it is said, chronic lung and heart diseases. The presence of any acute disease is believed to afford protection. One attack of influenza does not prevent another, and it has even been stated to render the individual more susceptible.

Anatomical Characters.—The usual morbid appearances in influenza are those of catarrh of the mucous membrane of the nose and its communicating sinuses, conjunctivæ, mouth, throat, and respiratory tract. In severe cases capillary bronchitis, pulmonary congestion and œdema, or pneumonia may supervene, the inflammation often involving both lungs. Sometimes the lining membranes of the entire alimentary canal and genito-urinary apparatus are affected. Occasionally pleurisy or pericarditis supervenes; or very rarely meningitis. There is no splenic enlargement.

Symptoms.—Influenza is a disease running a specific and definite course, characterised by pyrexia with much constitutional disturbance, and local symptoms due to the implication of the mucous membranes. The *period of incubation* generally lasts from a few hours to five or six days, but may extend to two or three weeks.

The general symptoms usually precede the local, but not always. The invasion is often markedly sudden, but in other cases it is gradual. The early symptoms are chilliness, lassitude, pains in the limbs, and in some cases intense headache or nausea and vomiting; followed by fever, which is usually high, the skin being very hot and dry, though sometimes there is much sour perspiration. At the same time the patient complains of a feeling of great prostration and debility, apathy, lowness of spirits and mental inaptitude; with severe aching and shooting pains about the chest, back, limbs, and neck; headache, giddiness, and general restlessness. The pulse is at first frequent, full, and bounding, but soon tends to become soft, weak, and slow. The urine is febrile. The pyrexia generally presents evening exacerbations, and is said to be in some districts intermittent. In uncomplicated cases its duration usually varies from four to eight days, being frequently terminated by critical perspiration, abundant urine with deposit of lithates, or diarrhœa; but in other cases it subsides gradually.

The local symptoms vary according to the seat and extent of the catarrh of the mucous membranes. Usually this begins in the nose and conjunctivæ and spreads downwards. The nose feels hot and dry at first, and the eyelids smart. Soon a watery acrid discharge flows abundantly, and there is much sneezing, the sense of smell being impaired or lost; occasionally profuse epistaxis occurs. The mouth, tongue, and throat feel sore, and taste is defective. Severe pain is experienced across the forehead, owing to implication of the frontal sinuses. There may be pain along the Eustachian tube, with noises in the ears and some deafness. Examination reveals redness of those membranes which can be seen, and often herpes is visible about the lips. The symptoms indicating implication of the air-passages are hoarseness; soreness and a tickling sensation along the larynx and trachea; more or less dyspnœa; oppression and stuffiness across the chest; paroxysmal cough, at first dry, but afterwards attended with bronchitic expectoration. These catarrhal symptoms usually subside from the fifth to the seventh day, the materials discharged undergoing the ordinary changes observed in the course of a catarrh. The tongue is furred, and there is much thirst with loss of appetite. Gastro-enteric catarrh is evidenced by epigastric pain and tenderness; redness of the tongue; nausea or vomiting; and diarrhœa.

Cases differ much in their severity, and not unfrequently dangerous lung complications arise, especially capillary bronchitis and pneumonia. The latter is apt to come on very insidiously, without any prominent symptoms. In these and other cases there is sometimes a tendency to adynamia, the tongue becoming brown and dry. Nervous symptoms are occasionally prominent, viz., delirium, stupor, and convulsions.

Duration and Terminations.—Uncomplicated cases of influenza generally begin to convalesce from the fifth to the tenth day, but the duration may be much prolonged by complications. The great majority of cases end in recovery, but convalescence is often very tedious, and sequelæ are apt to remain, viz., great debility and nervous depression; neuralgic and rheumatic pains, which are common about the head and neck; or persistent cough. Occasionally chronic bronchitis and emphysema, chronic laryngitis, or phthisis is set up. Death is usually the result of lung-complications, but sometimes follows adynamic symptoms.

Prognosis.—The circumstances which make influenza grave are very early or advanced age; a feeble constitution; the presence of chronic pulmonary or cardiac disease; serious lung-complications, with great dyspnœa, inability to expectorate, and signs of imperfect blood æration; nervous disturbance; evidences of weak circulation; adynamic symptoms. Some epidemics are much more fatal than others.

TREATMENT.—It has been satisfactorily proved that lowering treatment is injurious in influenza. In all cases it is advisable to keep the patient in-doors, in a cool, well-ventilated room, but protected from draughts. At the outset a purgative is useful, and in adults a dose of calomel seems to be beneficial, but repeated purgation is decidedly to be deprecated. Some recommend an emetic at the commencement, but such treatment is only indicated if there is much nausea. The diet must depend on the nature of the case; if it is slight, a moderate quantity of beef tea and milk may be allowed; but in severe cases attended with much depression a considerable amount of liquid nourishment is required. It is found that it is better to give things cool, and cold or iced drinks are very grateful and may be freely allowed. Dr. Parkes recommends a highly diluted solution of nitrate of potash with lemon-juice and sugar. Stimulants are not required at first unless there is much debility, except in old persons, who generally need them early; in some instances large quantities of wine or brandy are called for, but they must be used cautiously. Quinine is a remedy which is usually well borne and does much good; it is most valuable towards the decline of the disease, but may be given from the commencement.

The catarrhal symptoms are best relieved by inhalations of steam, to which some add ether, chloroform, or conium. Dr. Parkes suggests that direct local applications to the nasal mucous membrane and throat might be useful. For the bronchial catarrh ipecacuanha wine in full doses answers best, and it may be combined with some sedative, such as henbane or conium, care being taken that there is no accumulation of secretion. Opium should be employed with caution. Poultices, sinapisms, and warm or anodyne fomentations to the chest are often valuable. Should capillary bronchitis or pneumonia supervene, stimulant treatment is decidedly indicated, ammonia with decoction of bark and chloric ether, camphor, and such remedies being administered, as well as alcoholic stimulants. Free dry cupping is often valuable in these cases. The patient must be encouraged to cough should there be extensive bronchitis, in order to get rid of the secretion, and if this accumulates an emetic must be given.

If the pains are severe, iodide of potassium with quinine often gives relief. It may be necessary to administer opium, and perhaps subcutaneous injection of morphia might be attended with benefit. Some recommend colchicum. Pyrexia may be moderated by cold sponging. Cold to the head and the application of two or three leeches might be necessary should dangerous nervous symptoms arise.

During convalescence tonics are needed, especially quinine and iron, with nourishing food and wine or beer. Change of air is highly beneficial, and the patient must wear flannel, and guard against taking cold. Expectorant remedies are often required at this time, and excessive cough must be allayed by opiates.

Chapter XIX.

EPIDEMIC, ASIATIC, ALGIDE, OR MALIGNANT CHOLERA. —CHOLERA MORBUS.

Etiology.—Cholera is an *acute specific disease*, which chiefly prevails as a virulent epidemic, but in certain regions is endemic. The *exciting cause* is undoubtedly a *specific poison*, the nature of which is quite unknown, though it has been presumed to consist of certain microscopic living organisms and their germs which have been described by different observers as being present in the excreta and blood. The careful researches of Drs. Lewis and Cunningham have, however, led them to conclude that cholera is not dependent upon any microscopically-demonstrable poison. It is unquestionably an infectious disease, and is capable of being transmitted from one human being to another, but there is abundant proof that the stools constitute the main, if not the only channel of contagion, and that the great cause of the propagation of cholera is the contamination, in one or other of the ways mentioned in the chapter on contagion, of the water used for drinking purposes with the excreta of persons suffering from the complaint. It has been found that the admixture of an extremely minute quantity of the specific stools will impart to great quantities of water the power of originating the disease if taken into the alimentary canal. Probably the contagium becomes rapidly multiplied in the water, especially if this is exposed to the heat of the sun. Milk is also liable to convey the cholera poison, as in the case of typhoid fever, and possibly other articles of food may be the vehicle for its transmission. There does not seem to be any danger from merely being in the presence of those suffering from cholera, but emanations from the excreta into the atmosphere may generate the disease, being afterwards swallowed or inhaled, especially in places which are ill-ventilated.

The poison of cholera has been regarded by some as having a malarial origin, and they deny that the malady is infectious. Pettenkofer believes that the germs of the disease after leaving the human body develope and multiply in the subsoil moisture under the influence of heat, and rise as a miasm into the atmosphere.

The immediate cause of a cholera-epidemic is often obscure and difficult to detect, but a more correct knowledge of the etiology of the disease will probably in future clear up much of the obscurity on this matter. Many authorities maintain that cholera has been imported into Europe and other parts of the world from India, and Macnamara affirms that every outburst of the disease can be traced back through a series of cases to that country, it being propagated by human agency and always following the principal paths of human intercourse.

Certain conditions tend to promote the spread of cholera and aggravate its intensity, viz., a high temperature, with a moist, heavy, and stagnant atmosphere, cholera being therefore more prevalent in certain hot climates and in hot seasons; a low position of a district; unhealthy sanitary conditions, especially overcrowding, want of proper ventilation, accumulation of decomposing organic matter from imperfect drainage or any other cause, and impure and unhealthy food and water. Many other conditions have been supposed to affect the prevalence of cholera, such as the nature of the soil, the electrical state of the air, or the amount of ozone in it; but the statements on these matters are quite contradictory. It is found that most cases of cholera break out early in the morning.

Certain individual *predisposing causes* have been mentioned, but about many of these there is also much contradiction. Among the chief are fatigue, as after marching a long distance; destitution; errors in diet; abuse of purgatives; depressing mental influences, especially grief and fright; rather advanced age; race; intemperate habits; a bad state of health; certain occupations; recent arrival in an infected district. One attack does not afford protectection against another.

Anatomical Characters.—The morbid appearances met with in the majority of cases of death from cholera may be thus summarised:—The temperature generally rises after death, and the body remains warm for some time. Rigor mortis sets in very speedily, there being often powerful muscular contractions, displacing and distorting the limbs. The skin is mottled, more or less livid or blue, especially in dependent parts, and the limbs are shrunken, but these appearances are less marked than before death. Some striking peculiarities as regards the distribution of the blood are usually met with. The left cavities of the heart are contracted and rigid, almost or quite empty, as well as the arterial system generally; the right cavities are distended with blood, as are also the pulmonary artery and its divisions and the systemic veins. The capillaries of the lungs, however, and the pulmonary veins contain little or no blood, and these organs are in a state of more or less collapse, in some cases being almost completely airless and bloodless. Occasionally there is some hypostatic congestion. The condition just described is regarded by some observers as highly important in a pathological point of view, but Macnamara affirms that it is frequently due to *post-mortem* change, the blood being forced by *post-mortem* rigidity out of the left ventricle and arteries into the capillary and venous systems; and that if the examination is made immediately after death, the left side of the heart will be found as full of blood as the right. Most of the organs of the body are not congested but shrunken and pale, their capillaries being empty, but the alimentary canal and kidneys are commonly more or less injected, The blood is frequently much altered in its physical and chemical characters, being thick, dark, and tarry-looking, becoming lighter on exposure. Most observers affirm that it is deficient in coagulability. Ecchymoses are sometimes seen under mucous and serous membranes; while the endocardium and serous fluids are often stained with hæmatine.

The stomach and small intestines generally present more or less injection of their mucous lining, that of the intestines being also somewhat thickened and œdematous. The bowels are distended and contain a quantity of materials in the main similar to those discharged during life. They differ, however, in having an abundant admixture of shed epithelium, which is believed therefore to be detached after death. Sometimes there are masses of gelatinous or fibrinous matter, or much grumous blood. The glandular structures are commonly enlarged and prominent, especially Peyer's and the solitary glands, the latter in rare instances presenting ulceration. In exceptional cases a diphtheritic deposit has been observed. The large intestines are usually contracted, but do not exhibit any special characters. The bladder is contracted, sometimes extremely so, and its epithelium, as well as that of the urinary passages and vagina, may be shed profusely.

In cases which survive into the *reaction-stage* there are more marked *post-mortem* appearances, indicating gastric and intestinal inflammation; acute Bright's disease; extreme congestion, low inflammation, or gangrene of the lungs; serous inflammations of a low type; or other complications to be hereafter mentioned; whilst those characteristic of cholera disappear more or less.

SYMPTOMS.—Cholera affords in typical cases a well-defined clinical history, which it is customary to divide into certain stages. The *period of incubation* is of uncertain duration, but it may range, according to different observers, from one to eighteen days. From two to four days is a common incubation-period (Squire).

1. *Premonitory Stage.*—In many instances this stage is not apparent, the disease manifesting itself suddenly in all its virulence. Diarrhœa is the most important premonitory symptom observed, which may or may not be attended with griping. Nervous disturbances have also been noticed sometimes, though many doubt their reality, such as a sense of languor, debility, exhaustion, or marked depression, trembling, altered expression of countenance, unaccountable lowness of spirits, headache, giddiness, noises in the ears, epigastric uneasiness and oppression, &c. This stage is of short duration.

2. *Evacuation Stage. Stage of Development.*—At this time the prominent symptoms are severe purging and vomiting, the materials discharged having special characters; constant thirst; painful cramps; with signs of marked general disturbance, in the direction of prostration and collapse with great restlessness. The purging is the first symptom, and it often sets in early in the morning, becoming speedily very frequent or almost constant, being followed by a sense of much exhaustion, and of sinking at the epigastrium. The stools are very profuse, watery, at first coloured by the previous intestinal contents, but soon presenting

peculiar characters, and being named "rice-water" stools, their resemblance to water in which rice has been boiled. they are perfectly liquid, exceedingly pale, somewhat opalesce occasionally whitish or milky, with but little odour. On stan more or less sediment falls, resembling flakes of boiled rice, ing a whey-like fluid above, which has a specific gravity of 1005 to 1010, and a neutral or slightly alkaline reaction. quantity of deposit is actually very small, Dr. Parkes having f the amount deposited from a pint not to weigh when dried than 4 grains. Chemically the evacuations consist mainly of w holding in solution a considerable proportion of salts of soda potash, especially chloride of sodium, with but very little albu or other organic matter. The sediment has been supposed modified fibrin or mucus. Microscopically the objects which been described are abundant granules; active, amœbiform p cles of "bioplasm;" nuclei; round, nucleated, and granular resembling pus or exudation cells; peculiar hyaline cells; epithelium particles; fungi, bacteria, vibrios; and occasio triple phosphates. In exceptional cases blood or its colo matter is discharged. Often the diarrhœa is painless, but may be griping, and a burning sensation at the pit of the sto is frequent. Vomiting comes on later, and is less severe an fuse, occurring chiefly after anything is taken The vo matters, which are often expelled with much force, are at fi previous stomach-contents, but soon consist of a clear, colourl yellow, thin fluid, with mucus and disintegrated epithelium. cramps usually set in at the same time as the rice-water stoo fecting mainly the fingers and toes, calves of the legs, and t but sometimes the abdominal muscles also suffer. Thirst becomes a distressing symptom.

In proportion to the severity of the purging and vomiti sense of exhaustion is felt, and signs of depression and co appear, culminating, if the symptoms do not subside, in characteristic of the next stage, under which they may be conveniently described.

3. *Stage of collapse. Algide stage.*—There is no abrupt comm ment of this stage, but a more or less rapid transition fro former. The aspect of the patient becomes highly charact The features are pinched and shrunken, assuming a leaden hue, especially about the lips; the eyeballs sink in their s while the lower eyelids fall and the eyes are half closed; the is sharp and pointed, and the cheeks are hollowed. The enti face is more or less cyanotic, especially that of the extre while the skin presents a peculiar wrinkled and shrivelled being often at the same time bathed in cold sweats, the han pearing sodden like those of a washerwoman. When pinch the folds disappear slowly. The temperature rapidly fal the surface soon has a death-like coldness, particularly on posed parts, though it is stated that the temperature wit body is usually increased. In the mouth it ranges from 79° in the axilla from 90° to 97° (Goodeve). In the vagina an

tum it is considerably higher. The circulatory organs and blood give evidences of grave disturbance. The radial pulse is exceedingly feeble and thready or even extinct, and in bad cases no pulsation can be felt in the brachial or even in the carotid arteries, while the cardiac impulse and sounds become extremely weak or almost imperceptible. The general capillary circulation is seriously embarrassed. When a vein is opened little or no blood escapes, this being thick, viscid, and tar-like. The respiratory functions are also impeded. There is paroxysmal dyspnœa, with gasping for breath, and a sense of oppression and craving for air, at last almost continuous. The expired air is cold and very deficient in carbonic anhydride. The voice is extremely weak, often whispering or entirely inaudible. The nervous system necessarily suffers severely. As a rule muscular prostration is marked, but the strength is now and then wonderfully retained. There is great restlessness and jactitation with wakefulness, the patient tossing about and throwing off the bed-clothes. At first much anxiety is felt, but this soon changes into apathy and indifference. Occasionally headache, giddiness, tinnitus aurium, muscæ volitantes, or cloudiness of vision are complained of. The mind is at first clear though inactive, but in cases ending fatally stupor sets in, followed by coma. Reflex excitability is markedly impaired. Cramps continue from time to time.

A prominent feature of this stage is the impairment or complete cessation of the functions of absorption and secretion. No saliva is formed; while the urine is almost entirely or quite suppressed. At this time the purging and vomiting diminish in amount and frequency, though there may be much retching; the stools are less liquid usually, and contain mucus or gelatinous masses; they are often passed in bed. Ultimately they may become extremely offensive, the smell resembling that of decomposed fish. Intense thirst is experienced, with a sense of heat in the epigastrium, the patient constantly craving for cold drinks, which are swallowed with spasmodic avidity, probably to be immediately rejected. The tongue feels cold.

The intensity of the symptoms described varies much. When they are developed in their full severity recovery seldom takes place, death occurring more or less speedily, preceded by signs of more and more interference with the respiratory functions, increased capillary stagnation, and coma. In most cases the temperature rises with the approach of death. In the less marked cases, however, recovery follows not unfrequently, and there is no condition which is utterly hopeless. The phenomena attending restoration will now be considered.

4. *Stage of Reaction.*—The signs indicating restoration are a gradual change in the expression, general aspect, and colour; improvement in the pulse and cardiac action, with diminution in the capillary stasis; and return of heat to the surface; breathing becoming at the same time more regular and calm; while the restlessness, thirst, and other symptoms abate, and the secretions are re-established. The patient often falls into a calm doze; vomiting

ceases, but a little purging may continue, the stools, however, containing bile. There is said to be no actual rise of temperature at the beginning of reaction, but a cooling of the interior parts of the body while the outer parts warm up (Jüterbogk). This stage may terminate in speedy convalescence, but this is often not the case, certain *complications* or *sequelæ* being very liable to happen, or now and then a *relapse* taking place, which may prove fatal. Occasionally also the reaction is imperfect, and the symptoms continue more or less, there being no pyrexia, the patient dying in a few days, or sinking into a typhoid state, or ultimately making a slow progress to recovery. A most important matter during the progress of convalescence is to look for the restoration of the secretions, especially the urine. The temperature not unfrequently rises above the normal without any obvious cause.

COMPLICATIONS AND SEQUELÆ.—Among the less important of these mentioned by Dr. Goodeve are mild consecutive fever, with general disturbance, which may assume a remittent or intermittent type, usually ending in recovery in a few days; obstinate vomiting, often associated with more or less gastritis, which may become very serious; frequent hiccup, with gaseous eructations and loss of appetite; and want of sleep. The more grave complications usually met with are acute desquamative nephritis with uræmia, which may become chronic; "cholera typhoid;" severe enteritis, which may be of a diphtheritic character; chronic diarrhœa or dysentery; low pneumonia or pleurisy. The urine is usually albuminous, and may contain some hyaline casts during convalescence, but in favourable cases it soon becomes normal. In some instances, however, it assumes the characters indicating acute renal disease, along with the other symptoms of this condition, and signs of uræmia. The term "cholera typhoid" has been used vaguely; the symptoms are merely those pertaining to the "typhoid state" generally, and they may be associated with uræmia; with any adynamic inflammation; or be independent of visible morbid changes, being then probably due to blood-poisoning. The temperature rises if inflammatory complications set in.

A cholera-eruption or exanthem has been described, but though erythematous, maculated, papular, urticarial, or even purpuric eruptions appear in some instances, there is none characteristic of cholera.

As occasional sequelæ are mentioned inflammation of the genitals; parotid bubo; ulceration of the cornea and its consequences: gangrene of various parts; bed-sores, boils, ulcers, &c. In many cases, especially if the illness has been prolonged, a condition of marked debility and anæmia remains behind.

VARIETIES.—In some cases the collapse stage sets in after little or no previous purging or vomiting, death ensuing very speedily. On the other hand this stage may be imperfectly developed. During an epidemic of cholera numerous cases of diarrhœa are met with, lasting several days, generally unattended with pain, to which the terms "choleraic diarrhœa" or "cholerine,"* are ap-

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* The term "cholerine" has also been applied by Dr. W. Farr to the poison which originates cholera.

The stools are usually pale, liquid, and copious; and there
›e vomiting and cramps, while the patient feels much ex-
:d and seriously ill. These cases have been regarded as the
of a milder dose of the cholera poison, and they may pass
:ue cholera, though sometimes they prove fatal independently
t. Towards the end of some epidemics the choleraic diar-
passes into a kind of low fever.

re also may be mentioned the so-called *sporadic*, *bilious*, or
th cholera, or *summer diarrhœa*, the symptoms of which some-
closely resemble those of true cholera. Ordinarily they are
evere; the stools and vomited matters contain bile; there is
griping; urine is not entirely suppressed; the duration is
r; while the mortality is much less (Goodeve). Some cause,
as an error in diet, can generally be found for the attack.

THOLOGY.—All authorities seem agreed that cholera is pri
y due to the action of some specific morbid poison upon the
m, the nature of which is at present doubtful. Beyond this
there are wide divergences of opinion. Dr. G. Johnson and
s consider that all the phenomena of cholera are due to this
n, which acts first on the blood, in which it is enormously
plied, and then affects certain portions of the nervous system,
ially the sympathetic and the nerve centres influencing the
ratory and circulatory organs, thus leading to paralysis of the
of the intestinal smaller arteries and capillaries, with conse-
t free transudation, while the small vessels of the lungs are
nodically contracted and will not allow the blood to pass
gh these organs. According to this view the purging and
ting are regarded as eliminatory of a morbid poison. Ano-
class of pathologists believe that the cholera-poison acts
tly on the alimentary canal, and that the subsequent pheno-
of collapse are the consequence of the intestinal disease, and
violent purging and vomiting accompanying it, being due to
hysical changes in the blood and disturbance of the sympa-
nerve thus induced. The blood does undergo some very
ed alterations. As already stated, it becomes very thick and
Water is rapidly withdrawn, both from the liquor sanguinis
he corpuscles, and hence a serious disturbance in the relations
ese to each other arises. Soon also the proportion of saline
dients is much diminished, while that of the organic elements
latively increased, especially the corpuscles and albumen.
specific gravity is considerably raised. Occasionally the
l is acid. During the collapse stage it may contain urea and
products of decomposition, some of which may result from
ges in the stagnant blood itself. In the reaction stage these
often very abundant. Drs. Lewis and Cunningham have de-
:d peculiar microscopic changes observed in choleraic blood
ved during life, as well as in that obtained after death, viz.,
apid development and multiplication of active bioplastic
s, ultimately forming cells; and they consider that these
ges may go on in the body, and that this may account for the
lant bioplasts and cells found in the cholera evacuations.

The alterations in the blood will explain the thirst; the drying up and shrivelling of the tissues; and also, to a great degree, the capillary stagnation; disturbance of the respiratory and circulatory functions; and suppression of secretions. At the same time these phenomena are partly to be accounted for by the influence exerted upon the heart through the sympathetic, the feeble action of this organ aiding in producing many of the symptoms, because it cannot drive the blood through the vessels. The dyspnœa is also to some extent due to the pulmonary collapse. The cyanotic appearance is partly the result of the stagnation of blood; partly of its concentrated and venous character.

It is important to note that the fact of purging ceasing during the collapse period does not imply always that fluid has ceased to transude, for at this time the intestines are often paralyzed, and may contain a large quantity of fluid which they are unable to expel.

The phenomena which characterize the reaction-stage are due chiefly to the impurities which accumulate in the blood, and they are more liable to arise in proportion to the duration of the collapse stage, and to the length of time which elapses before secretion is properly set up after reaction has commenced. They are probably promoted in some cases by improper employment of stimulants and drugs.

PROGNOSIS—MORTALITY—DURATION.—It need scarcely be remarked that the prognosis in cholera is always very grave. The mortality varies in different epidemics, ranging from 20 or 30 to 70 or 80 per cent.; it is higher in the early part of an epidemic. On an average more than half the cases recover. The chief general circumstances rendering the prognosis worse are infirmity and old age; unfavourable hygienic conditions; previous intemperance; debility from any cause; the existence of renal disease. During the actual attack the prognosis, both immediate and remote, is more grave in proportion to the rapidity with which signs of collapse set in, as well as to their intensity and duration. Rapid cessation of pulsation in the larger arteries; great disturbance of the respiratory functions; a striking fall in temperature; marked cyanosis; or tendency to coma, are all very bad signs. The cessation of purging is sometimes unfavourable, indicating paralysis of the intestines. When reaction sets in there are many dangers to be feared, but a more favourable progress to convalescence is to be expected in proportion to the rapidity with which the functions of secretion and absorption are re-established, and to the continuous and regular improvement in the symptoms. Most of the subsequent complications or sequelæ are exceedingly serious.

The duration of cases of cholera may range from a couple of hours to some weeks, reckoning in its sequelæ. The average duration of fatal cases is about from two to three days. The length of each stage varies considerably.

TREATMENT.—The *preventive treatment* of cholera is extremely important, and first calls for consideration. During an epidemic of this disease all the rules laid down in a former chapter as to the management of contagious diseases and epidemics must be rigidly carried out, under the personal superintendence of competent individuals. Cleanliness and free ventilation are highly important. Particular attention is demanded with regard to the choleraic stools, which should be immediately disinfected, and so disposed of that there is no danger of their becoming mixed with drinking water, care being taken that the sewers and drains are kept in good order, and that they are well flushed from time to time with disinfectants. On no account must the excreta be recklessly thrown out on the ground, and if there is no proper place to receive them, they should be buried at a considerable depth in the earth, away from all habitations. Most important is it to attend to the water-supply, and to see that the water used is abundant and pure. It should always be filtered. Food must also be looked to, and especially milk. Persons should be warned against errors in diet, intemperance, and other injurious influences, and everything must be done to calm the minds of those inhabiting an infected district, and to prevent needless fear and depression. During epidemics it is very properly the custom to organise staffs of medical men and their assistants, in order to carry out thoroughly all the necessary preventive measures, and to treat cases as soon as they arise, house to house visitation being practised daily. If possible, it is highly desirable for persons to remove from infected districts.

With regard to the disposal of the dead, the bodies should be buried as soon as possible, each being surrounded in its coffin with some disinfectant, such as a mixture of charcoal, lime, and carbolic acid. An apartment which has been occupied by a cholera-patient must be thoroughly disinfected and cleansed, and it is often necessary to destroy clothing and bedding.

The *curative treatment* of cholera is unfortunately in many cases quite hopeless, but often much may be done, particularly at an early period of the complaint. It is a great mistake to follow a routine plan in all cases, but the practitioner should be guided as to the measures to be employed by the actual condition of the patient and the stage of the disease. Personal attention on the part of the medical man is desirable, so far as this is practicable, in order to see that the treatment is properly carried out. The earlier this is commenced the more likely is it to be successful, and patients should take to their bed at once. During a cholera epidemic the slightest case of diarrhœa ought to receive the most prompt attention, and the public should be instructed on this point, and places established where they may at once obtain the necessary medicines.

In the *evacuation-stage* two directly contrary plans of treatment have been employed, most practitioners using measures for checking the diarrhœa; a few encouraging it, acting on the principle that it is eliminatory of a poison. Dr. G. Johnson gives castor oil at frequent intervals. Others have advocated the use of calomel, sulphate of magnesia, and other purgatives. Undoubtedly in some cases of early choleraic diarrhœa a dose of castor oil is beneficial, with the view of getting rid of irritant matters; but, apart from all theoretical considerations, experience has proved that the systematic employment of this plan of treatment is by no means favourable. Most decidedly the evacuations ought to be checked as soon as possible, in my opinion. Opium is the great remedy for this purpose, the best preparations being the pill, tincture, liquor opii sedativus, or Dover's powder, the liquid preparations answering best if there is much vomiting, or if speedy absorption is required. This drug, however, requires much care in its employment in cholera. Should there be signs that the collapse-stage is approaching particular caution is necessary in administering it, while it is inadmissible if this stage has become established. If the indications are favourable, it seems best to give a full dose at once and then repeat it in smaller quantities as it is needed. Should the first dose be vomited it must be repeated after a short interval. Various astringents are also useful, especially acetate of lead, (gr. ij—iij); tannic or gallic acid, (gr. x—xx); and dilute sulphuric acid. Some prefer giving opium by itself, and administering the remedies just mentioned between times; others combine them with the opium. The experience of some cases seems to indicate that the encouragement of very free sweating at the commencement of an attack of cholera may be beneficial.

In the *collapse-stage* opium must on no account be given, but if purging continues one of the astringents mentioned above may be employed. Most reliance can be placed at this time in the judicious use of stimulants. Before indications appear that collapse is setting in these are not called for, but as soon as any weakness of the pulse is observed or other signs of sinking, they should be commenced. The practice of pouring in large quantities of stimulants is to be highly deprecated, and their administration needs the most careful regulation. The best alcoholic stimulants are brandy with iced water and champagne. They must be given in small quantities; at more or less frequent intervals according to circumstances; and their administration must be mainly guided by their influence upon the pulse. If the purging has ceased, brandy may be given in enemata with beef-tea. Diffusible stimulants are also of service in this stage, viz., aromatic spirits, solution, or carbonate of ammonia; the various ethers; camphor, which has been vaunted as a specific; musk, and similar remedies. These may be combined with essential oils of peppermint, cinnamon, or cajeput. Niemeyer found a few cups of hot strong coffee useful in some cases.

With regard to diet, it is useless to give any nourishment at the commencement, as this is only rejected immediately. A little beef-tea, chicken-broth, or arrow-root and milk may be tried at a later period, if the vomiting ceases. The patient should be allowed an unlimited supply of ice to suck throughout, which Macnamara considers invaluable in the treatment of cholera, but he lays great stress on prohibiting every drink until the collapse-stage sets in, when iced water in moderation may be permitted. Enemata of iced water, or, on the other hand, those of warm milk have been recommended.

Local measures are often of much service for the relief of symptoms. A large mustard poultice should be applied at once over the abdomen, and repeated as required. For the cramps, hot-bottles, sinapisms, and friction, either with the hand alone or with turpentine or chloroform liniment, may be employed. If they are very severe, inhalation of chloroform is admissible. In the collapse-stage Niemeyer recommended the application of cold compresses over the abdomen.

Should reaction set in, the utmost care must be exercised. and the natural progress towards convalescence must not be interfered with by needless medication. The diet needs particular attention, only the blandest liquid food being allowed in moderate quantities, and this regulation of food is demanded until the patient has been entirely restored, it being improved gradually as the stools become natural. Water may be freely allowed at this time, and it has been recommended to dissolve some salt and carbonate of soda in it, in order to replace the loss of these salts. It is highly important to watch for the re-establishment of the secretions, and, if necessary, measures may be adopted to encourage this. Complications and sequelæ must be treated as they arise. It need only be mentioned here that it is not always desirable to check diarrhœa at this time, should the stools be very offensive; and that inflammatory affections require a supporting treatment. Tonics and iron are often serviceable during convalescence.

It is important to pay strict attention to the cleanliness and ventilation of the sick room, and to see to the immediate removal and disinfection of wet and soiled bed-clothes, it being advisable also to have a mackintosh placed under the patient. Due precautions must be taken against bed-sores, frequent examination of parts pressed upon being made. Should the urine be retained, the bladder must be emptied by means of the catheter; if it is suppressed, hot applications over the loins and dry-cupping are indicated.

For such a disease as cholera it is not be wondered at that innumerable specific modes of treatment have been advocated, but all have proved equally inefficient. Without making any comment, I merely mention some of the most prominent: viz., the administration of saline salts, chiefly carbonates and chlorides, either freely by the mouth, by enema, or by injection of a warm solution into the veins; the use of warm, vapour, or hot-air baths, or of the wet sheet; application of ice to the spine; the employment of antiseptics, such as carbolic acid, sulpho-carbolates, chloralum, &c.; inhalation of oxygen; inhalation of nitrate of amyl; calomel, gr. i—ij, at frequent intervals; bisulphide of mercury. The various cholera drops and pills which are in repute in different countries are made up of stimulants, generally combined with some preparation of opium.

CHAPTER XX.

GLANDERS AND FARCY—EQUINIA.

ETIOLOGY.—These affections, which are occasionally observed in man, are transmitted from the horse, ass, or mule. It is doubtful whether they are distinct diseases, or varieties of the same malady. They are produced by the inoculation or contact of a *specific poison*, which is contained chiefly in certain discharges, but also in the excretions, secretions, and blood; and they are rarely met with except among those whose occupation brings them much into contact with horses, viz., ostlers, grooms, &c.

Glanders may be propagated in consequence of a horse snorting and thus expelling a quantity of the discharge from the nostrils on to an individual, or into the surrounding air, from which it is afterwards inhaled. The poison may be conveyed by fomites to which the discharges become attached. It is even said that glanders may arise from breathing the atmosphere of a stable inhabited by glandered horses. These diseases can be re-transmitted to the horse and ass, as has been proved experimentally, and there is reason to believe that they are capable of being communicated from one human being to another.

ANATOMICAL CHARACTERS.—Glanders and farcy are characterized by certain peculiar morbid changes. In the former, hard nodules form in connection with the mucous membrane of the nose, mouth, throat, and respiratory passages; as well as in the lymphatic glands, skin, subcutaneous tissue, muscles, lungs, and other organs. These are made up of cells, the result of proliferation, which soon degenerate, the nodules rapidly becoming soft and breaking down, forming abcessses and ulcers. The Schneiderian membrane is inflamed, and presents little pustular elevations or patches, which finally break out into excavated ulcers, and may lead to necrosis of the cartilages and bones, with perforation of the septum. The frontal sinuses may contain a puriform fluid. The larynx, trachea, and bronchi are also frequently affected. The lungs present pneumonic patches or abscesses. Small yellow elevations may be seen on the pleuræ, with fibrinous deposits underneath. The lymphatic glands are enlarged, softened and reddish. Superficial petechiæ, ecchymoses, or gangrene are sometimes observed, or there may be suppuration or gangrene of the subcutaneous tissues or of the substance of the muscles. A peculiar eruption appears on the skin.

Farcy differs from glanders in the nasal mucous membrane not being affected, but so-called tubercles, buds, or tumours form in connection with the skin, which break down into deep, unhealthy ulcers; or the lymphatic system may be chiefly involved.

The appearances differ considerably, according as these diseases run an acute or chronic course.

SYMPTOMS.—*Acute Glanders.* The *period of incubation* is usually from three to eight days. After inoculation local signs of inflammation appear first as a rule, the neighbouring lymphatics being also affected. Ordinarily the disease is ushered in by such general symptoms as rigors, languor, pains in the limbs and joints, headache, often vomiting and diarrhœa, with a certain degree of pyrexia. Soon subcutaneous formations are noticed, especially on the face and near the joints, which quickly change into abscesses containing unhealthy and fœtid pus. Over these the skin becomes red or violet, and sometimes limited gangrene sets in. Usually a peculiar cutaneous eruption appears, especially on the cheeks, arms, and thighs. It begins as small, intensely red spots, which soon become papular and afterwards pustular. The pustules vary much in size and number, are flattened or acuminated at the summit, and often have a red areola. Sometimes the contents become sanguineous and dry up into small blackish-brown crusts. This eruption is not due to any exudation under the cuticle, but to circumscribed destruction of the true skin. Dark bullæ often appear also on the face, trunk, fingers or toes, and organs of generation, followed by gangrene. Erysipelatous inflammation of the nose, eyes, and surrounding parts is not uncommonly observed, which may extend to the scalp. The eruption is preceded and accompanied by profuse fœtid sweats.

A prominent symptom of glanders is a discharge from the nose, at first thin and scanty, but soon becoming abundant, purulent, viscid, extremely fœtid, and often sanious. It clogs the nostrils and obstructs breathing, while it escapes through the posterior nares, causing much distress and irritation. A thick matter also comes from between the eyelids, and sometimes from the mouth, which is then the seat of ulceration and pustules. The submaxillary lymphatic glands may be enlarged.

The constitutional symptoms increase in severity as the case progresses, being more or less of a typhoid character, and indicative of septicœmia. Thus there is marked prostration, with a brown and dry tongue, and a very rapid, feeble and irregular pulse. Diarrhœa and tympanitis are frequent symptoms, the stools being exceedingly fœtid and sometimes bloody. There is also dyspnœa, with hurried breathing, hard cough with but little expectoration, weak voice, and foul breath. Delirium and coma ultimately set in, and death terminates the scene, in most cases at the end of the second or beginning of the third week, but it may happen much earlier or later than this.

Chronic Glanders is very rarely met with and is usually a sequel of farcy. Its chief symptoms are lassitude and articular pains; sore-throat; disagreeable or painful sensations in the nose, with more or less puriform and bloody discharge; cough with expectoration, dyspnœa, and altered voice. After a time ulceration may be observed on the mucous membrane of the nose, followed by caries or perforation. The pharynx may also be ulcerated. There is no eruption. The general symptoms are less marked than in the acute form, but the latter may supervene. The duration of chronic glanders is very variable.

Acute Farcy. The great difference between this affection and glanders lies in the want of implication of the nares. In one class of cases the eruption is present; in another there is no eruption, but merely inflammation of the lymphatic glands and vessels, with soft tumours under the skin, named *farcy buttons* and *farcy buds*. The former are by far the more serious.

Chronic Farcy. After constitutional symptoms, subcutaneous tumours form, which become abscesses, and these discharge their contents, leaving foul, deep, and indolent ulcers. As a consequence there is wasting with great debility. The complaint may end in true glanders; or death may result from exhaustion or pyæmia. Occasionally recovery takes place. The duration is very variable.

An affection termed *equinia mitis* is described, derived by contagion from horses suffering from the "*grease*." The symptoms are fever, depression, with shivering, and a pustular eruption, which dries up into scabs, and these fall off, leaving distinct scars.

PROGNOSIS in all these affections is very grave, for they almost always prove fatal. *Chronic farcy* may terminate in recovery.

TREATMENT.—The most important matter is to exercise due precautions for the prevention of these diseases. If inoculation should happen, the affected spot must be immediately destroyed by some escharotic. A supporting, stimulating, and tonic plan of treatment is the only one which offers any chance of success in dealing with either of these affections, at the same time strict attention being paid to cleanliness and other hygienic conditions. Abscesses must be opened as they arise. Antiseptics internally might be of service.

MALIGNANT PUSTULE—CHARBON.

ETIOLOGY.—In this country malignant pustule is of extremely rare occurrence in the human being. It is a disease which is transmitted to man mainly from sheep and oxen, these, as well as horses and other animals, being liable to the malady, under the names of "joint-murrain," "black quarter," &c. The poison is usually conveyed by direct inoculation, the matter being brought in some way or other into contact with an abraded or wounded surface; but there is reason to believe that it may be absorbed by the unbroken skin in parts where this is very thin. Flies and other insects have been supposed to be instrumental in carrying the poison from affected animals to human beings. It is also probable that complaint may arise from eating the flesh of cattle suffering from it. The large majority of cases have been met with in healthy adult males.

SYMPTOMS.—Almost always some exposed part is inoculated, often the lip or some other part of the face, and at this spot the local signs of malignant pustule are first perceived. There is at the outset a little redness here, like that produced by the bite of a gnat, but very soon a small vesicle forms, attended with much itching or stinging, causing the patient to scratch. In a short time the tissues around rapidly swell and become hard, brawny, and discoloured, until ultimately the part affected assumes a black and gangrenous appearance. There is a surrounding erysipelatous areola, upon which secondary vesicles form; while the absorbent vessels and glands in the vicinity become inflamed. A fœtid odour arises, and if the lip is affected, saliva escapes in abundance, and the breath is extremely fœtid. Soon general symptoms indicative of blood-poisoning set in, viz., great prostration, cold clammy sweats, very weak and rapid pulse, hurried respiration, low delirium and other nervous phenomena. The great majority of cases terminate fatally.

PROGNOSIS is necessarily very grave, but recovery occasionally takes place, if energetic treatment is carried out at an early period.

TREATMENT.—As early as possible the affected spot should be incised, and effectually cauterized by means of potassa fusa or the actual cautery. Some disinfectant application should afterwards be used, such as a solution of carbolic acid. The patient must be kept in a well-ventilated apartment, and have abundant nourishment, with alcoholic stimulants. Quinine, tincture of steel, and mineral acids are the most reliable internal remedies. A solution of chlorate of potash may be used as a drink. Antiseptics internally might perhaps be serviceable.

CHAPTER XXI.

HYDROPHOBIA—RABIES.

ETIOLOGY.—Hydrophobia is unquestionably a *specific contagious disease*, resulting from the action of a *specific poison* of unknown nature, which in the human being is almost invariably introduced into the system through the bite of a mad dog inflicted upon some exposed part of the skin, but is in rare instances transmitted from other allied animals, as the cat, wolf, or fox. Only a small proportion, however, of those bitten by dogs actually suffering from rabies who take the disease. It may be conveyed in consequence of a dog merely licking an exposed surface; and it has even been supposed that the poison may be absorbed by the entire skin, where this is thin. The contagium is contained mainly in the saliva or buccal secretion. Some affirm that the disease can be transmitted from man to man. Mental anxiety has been presumed to predispose to hydrophobia, but there is no reliable evidence of this.

ANATOMICAL CHARACTERS and PATHOLOGY.—There are no absolutely characteristic morbid appearances associated with hydrophobia. The most important which have been observed are in connection with the brain and spinal cord, viz:—congestion of the meninges, with coagula in the sinuses; excess of fluid in the ventricles; effusion of blood and serum around the upper part of the cord, with small extravasations of blood in its substance. There may be increased vascularity of the fauces, and occasionally a depo lymph is observed here. *Post-mortem* congestion of depe parts is common.

It is supposed that the poison of rabies undergoes a kind o mentation, and becomes increased both at the wound and i system. It then acts upon the blood, and subsequently is pre to affect the eighth pair of nerves and the medulla oblo which will account for the phenomena observed.

SYMPTOMS.—A very indefinite *period of incubation* intervene tween the introduction of the poison and the development symptoms of hydrophobia. About forty days is said to b average, but it may vary from fifteen days to many month it is said, even years. In some cases unusual objective appea or subjective sensations are developed in connection with the trix of the bite before the symptoms break out, such as re itching, &c.

When the disease begins to declare itself the patient feels u fortable, low-spirited, despondent, restless, has an undefined f of anxiety or dread, and complains of giddiness or alternate and heats. Then follows a sense of oppression in the ches involuntary deep sighing inspirations from time to time, or a s catch in the breathing may first occur, attended with severe in the epigastrium, due to spasm of the diaphragm. The quent characteristic symptoms are grouped by Mr. Erichsen

1. Spasmodic affection of the muscles of deglutition and respi
2. Extreme sensibility of the surface and of the special s
3. Excessive mental terror and agitation. The nature of th lady is generally revealed to the patient by a fit of choking b on by an attempt to drink, and by finding that swallowing possible. This condition becomes rapidly worse and worse attempt at drinking bringing on a spasm of the muscles of de tion and respiration, which is attended with a feeling of i oppression and suffocation, causing great distress. Not quently solids can be swallowed at first without producin disturbance. Soon the sight or sound of any liquid, or an that even suggests drinking, brings on the spasmodic attack the patient spits out the viscid secretion which forms in abun in the mouth as fast as it is produced, so as not to be temp swallow it. Soon the skin and special senses become ext sensitive, so that the least touch or a sudden sound or lig bring on the spasms, which ultimately extend to other m assuming more or less the characters of general convulsions. patient is in a state of great terror, anxiety, and depression, bined with restlessness. Often fits of furious mania subsec occur, in which the patient is extremely dangerous and strange sounds, which has given rise to the idea of barking b symptom of this disease. In the intervals the intellect is ge quite clear. Sometimes there are curious persistent delusions the case progresses towards a fatal termination, which is the final result, the special symptoms diminish or may ev appear altogether, and the patient gradually sinks from exh

nd collapse. Rarely death occurs suddenly from suffocation durng a fit of spasm. The duration of the disease is from three to ve or six days.

Treatment.—The great thing is to prevent hydrophobia, by mmediately cauterizing the part bitten by means of nitrate of ilver, the hot iron, or potassa fusa; or by complete excision. ther modes of preventive treatment are quite useless. The paient's mind should be calmed as much as possible, and he should e prevented from brooding over his danger. There is no remedy hat I know of of any real service for the cure of hydrophobia, once he disease has become developed. Relief might be afforded by ub-cutaneous injection of morphia, atropine, or curara; the applicaion of the ice-bag to the spine; and inhalation of chloroform.

Chapter XXII.

DENGUE—DANDY FEVER—BREAKBONE FEVER.

Etiology.—Dengue is a peculiar epidemic fever which attacks a great number of people in rapid succession. It is not met with in his country, but prevails in America, the East and West Indies, and other parts. It is not known what the actual cause is; some believe it to be a contagious complaint, but the evidence on this point is insufficient.

Symptoms.—After an incubation-period of from twenty-four hours to ten days, the invasion is usually somewhat sudden, the symptoms being chilliness, a sense of debility and uneasiness. with violent pains in the muscles of the limbs and back, as well as in a variable number of joints, which are somewhat swollen. There is also headache, and the alimentary canal is often disturbed, but the tongue remains clear. At first the symptoms very much resemble those of rheumatism. Soon fever sets in, and sometimes a rash or papular eruption appears. The lymphatic glands and testicles may be painful and enlarged. In from twelve hours to three or four days the symptoms subside, but debility remains, with some painful sensations. After an interval of two, three, or four days the fever and pains return, or severe headache sets in. The tongue becomes much furred, and there is considerable epigastric uneasiness, with nausea. An eruption appears on the fifth, sixth, or seventh day, especially on the upper part of the body, which presents very variable characters, either resembling that of scarlatina or measles, or being papular, vesicular, pustular, furunculous, erysipelatous, or petechial. As it disappears a scaly desquamation sometimes takes place. It is attended with itching and tingling.

The symptoms present very different degrees of intensity, and they may assume an asthenic character. Almost all cases recover, the average duration being about eight days, but stiffness and soreness of various parts, with debility, may remain for some time, and sometimes several relapses occur.

TREATMENT.—Emetics are recommended at the outset, with free purgation. The patient must remain in bed. A saline diaphoretic mixture may be given, and opium is to be freely administered for the relief of pain. The surface may be sponged to subdue pyrexia, and cold applied to the head in order to relieve headache. The diet must be regulated, and if there are any signs of depression, stimulants and nourishing food should be given. Quinine and mineral acids are recommended during the remission and during convalescence.

CHAPTER XXIII.

PESTIS—PLAGUE.

ETIOLOGY.—This disease is of a specific nature, and generally prevails as an epidemic, but may be sporadic. Formerly it was met with in Europe, but at the present time its chief seats are Egypt, Syria, Asia Minor, and the coast of Barbary. It is undoubtedly contagious, and can be conveyed in various ways. The chief *predisposing causes* are—overcrowding and bad ventilation; want of cleanliness, with accumulation of filth; insufficient and unwholesome food; debility from any cause; a warm and moist condition of the air; residence on marshy soil or in the neighbourhood of certain rivers. Epidemics often follow famine, and are generally preceded by a sickly, oppressive, warm, and moist season.

ANATOMICAL CHARACTERS.—The blood is dark and remains fluid or coagulates imperfectly, while it rapidly putrefies. All the organs are greatly congested and softened, especially the spleen; also the mucous and serous membranes, which may present petechiæ and ecchymoses. The serous cavities contain more or less effusion. The absorbent glands generally are swollen, dark, softened, or disintegrated. Buboes and carbuncles are usually present.

SYMPTOMS.—Plague is characterised by fever, generally of a low type, with the local development of buboes, carbuncles, and petechiæ. The *period of incubation* is very short, and symptoms may set in almost immediately after exposure to infection. After inoculation, the distinctive glandular swellings are developed in four days. The invasion is sudden in most cases, and the severity of the constitutional symptoms varies from a slight fever to one of the most virulent kind. The early symptoms are rigors, restlessness, feeling of debility and languor, headache and giddiness, nausea or vomiting, and precordial oppression or uneasiness. The expression is heavy and stupid, and the eyes look muddy or suffused. Soon the temperature rises, while prostration increases, with a tendency to syncope. The pulse is frequent, but weak or irregular. The tongue is thickly furred, and tends to become dry and brown or ick, with sordes on the teeth. The other prominent symptoms : vomiting, sometimes of black matters; great thirst; diarrhœa :h offensive stools; hurried respiration; and very foul breath. e urine is much diminished and may contain blood. Hæmor- ages from mucous membranes are not uncommon. Nervous symp- ns are generally present, such as delirium, stupor, coma, or nvulsions. Death may take place before the appearance of any :al signs.

Buboes are formed chiefly in connection with the glands of the oin, but are also seen in the axilla and about the angles of the ws. They appear at different periods, being preceded by darting ins. Generally they form abscesses, which discharge and heal wly, leaving permanent scars. Carbuncles are observed mostly the limbs, but may affect any part. They vary in number and e, and are liable to end in gangrene, sometimes thus causing eat destruction of tissues. Petechiæ, vibices, and livid patches e seen only in bad cases, and there may be extravasations of ood in the subcutaneous tissue.

Prognosis is very grave.

Treatment.—Attention to all hygienic measures is essential. he bowels should be freely opened. An emetic at the outset is commended. Nutritious food, stimulants, mineral acids and nics are the remedies which afford the best results. Probably ose who advocate the use of antiseptics would give them largely this disease. Cold affusion or sponging may be employed. ultices are indicated for the buboes and carbuncles, with anti- ptic dressings when they are discharging.

Chapter XXIV.

YELLOW FEVER.

tiology.—There is much discussion amongst those who have had portunities for the observation of cases of yellow fever, as to hether it is *malarial* in its origin, or of the nature of a *specific ntagious disease.* Most authorities maintain the latter view, olding that true yellow fever is of the continued type, but that it ay be simulated by malarial remittent fevers. There appears to : strong evidence to prove that the disease can be conveyed by fection, and it has thus originated in seaport towns in this and her countries, owing to the arrival of vessels with cases on board. omites may be the means of propagating it.

Dr. Hamilton, in an excellent Thesis on Yellow fever, sums up is conclusions as follows:—

"1. That yellow fever is the highest development of a group diseases which depends on some unknown cause, but which ap- ears to be in some way connected with, or dependent on, organic ecomposition.

2. That the various individual diseases of this group may change their type and pass one into the other, according to the intensity of the cause, or the more or less favourable conditions under which such cause acts.

3. That the general laws of zymotic diseases, as observed in this country, hold good for this group also.

4. That the same causes which augment or develope contagious properties in the zymotic diseases of this climate, will develope contagious properties in yellow fever.

5. And that consequently yellow fever may under such circumstances become contagious and spread."

In certain regions yellow fever is endemic, and it occurs also in severe epidemics. Its principal seats are the West Indian Islands, the seaports of North and South America, the south coast of Spain, Mexico, and the West Coast of Africa. It requires a temperature of at least 72° F., and is rarely met with at an altitude of more than from 2,000 to 3,000 feet above the level of the sea.

Among the chief external *predisposing causes* are—long-continued high temperature; a swampy or low-lying and crowded district; filthiness and other anti-hygienic conditions. The disease is more liable to attack children, males, the white races, and those who have recently come into an infected district. Intemperance and other excesses, fatigue, exposure to night air and dews, also increase the liability to the complaint, and individual predisposition seems to exist.

Anatomical Characters.—The body may be emaciated or not. The skin is of a deep yellow colour, as well as much congested in dependent parts and in those distant from the centre of circulation. The tissues generally are softened and flabby. More or less congestion of organs is observed, sometimes with extravasations of blood and effusions into serous cavities. Softening of the heart with molecular degeneration of its fibres is usually met with, and the blood coagulates imperfectly, though soft clots are generally found in the cardiac cavities. The stomach is the most frequent seat of morbid changes. It often contains more or less "black vomit," or blood ndergoing alteration. Sometimes a black or bloody mucus sticks the lining membrane. Signs of congestion or inflammation are esent in most cases. An inflammatory condition has been described in connection with the membranes of the cord and the sympathetic system.

Symptoms.—The prominent symptoms of yellow fever vary in different epidemics, and cases exhibit all grades of intensity, from a very mild form of the disease to one of the most malignant type. Usually three stages may be recognized, following a *period of incubation*, the duration of which is usually from two to four days, but it is said it may range from one to fifteen days.

1. *Invasion stage.* The attack may be preceded by premonitory symptoms, or may come on quite suddenly. Chills generally occur at the outset, but are not always observed in tropical climates. These alternate with a sense of heat, and soon there is marked pyrexia, the degree of this being in proportion to the previous

chills, the temperature presenting some morning remission. The pulse is frequent and in most cases full and strong. The face is flushed, the eyes are red and suffused, and the expression anxious and distressed. The skin feels hot, dry, and harsh. The tongue is covered with a white fur, moist, red at the tip and edges, with enlarged papillæ. Sore throat may be complained of, and there is a constant desire for cool drinks or ice. Gastric symptoms may be present from the first, but as a rule only become prominent in from twelve to twenty-four hours. These are oppression, uneasiness, weight, or burning pain in the epigastrium, with considerable tenderness; nausea, violent vomiting, and retching, the vomited matters being of a bilious character, or containing streaks of blood or chocolate-coloured flocculi. After a while the stomach rejects everything without any effort. There is usually obstinate constipation, with unhealthy stools, deficient in bile; and there may be much flatulence. The urine is deficient and of dark colour; it usually contains albumen.

Nervous symptoms are the most distressing in the majority of cases. Severe frontal headache is complained of from the first, with shooting pains in the temples and eyes. One of the earliest and most prominent symptoms, however, in most instances, is pain in the lumbar region and limbs, which often becomes so intense as to elicit screams and groans, and to make the patient writhe in agony. As this stage advances the patient becomes very restless, the mind is confused, or wild violent delirium may set in, attended with hallucinations. Occasionally there is more or less stupor.

This stage lasts from a few hours to two or three days usually, but may extend to four or five days. It is longer in the milder cases.

2. *Stage of Remission.* A marked improvement is observed at the close of the first stage, which in most cases is only temporary but sometimes is permanent, convalescence setting in, preceded by critical discharges. The symptoms subside more or less completely, the patient feeling comparatively comfortable and often hopeful, occasionally appearing to be quite well. But at this time there are frequently some unfavourable signs, viz., greater tenderness in the epigastrium; a yellowish tinge of the skin and urine; a slow pulse; and sometimes heaviness or stupor. The duration of this remission is usually but a few hours, but may extend to twenty-four hours.

3. *Stage of Collapse or Secondary Fever.* In most cases signs of collapse appear, with great prostration and debility. The skin generally assumes a yellow, orange, or bronzed hue, but not invariably. This spreads from the forehead downwards, and is dependent upon the colouring matter of the blood. The circulation is impeded, the pulse becoming very rapid, weak, and irregular, and capillary congestion or stagnation being observed in dependent and distant parts, with sometimes petechiæ and vibices; at the same time the heart may be beating violently. In bad cases hæmorrhages are common, especially from the mucous surfaces. The tongue tends to become dry, brown, or black; or it is smooth,

red, and fissured; at the same time sordes may form on the lips and teeth. The gastric symptoms return and become very intense. The so-called "black vomit" sets in by degrees, the black colour being probably due to altered blood. It is often preceded by "white vomit." Black vomit is not a constant symptom, and its exact characters vary, sometimes pure blood being discharged. Similar matters may pass off in the stools. The urine is often more or less deficient and contains albumen; it is sometimes entirely suppressed or retained. The patient frequently lies in a state of apathy and gloomy indifference. Ultimately collapse becomes extreme, with a cold, clammy skin; slow, sighing respiration; and hiccough. Consciousness may be retained to the last, or low delirium or coma may set in, with convulsions at the close.

In some cases the symptoms are those of more or less secondary fever instead of collapse. This course of events may terminate in convalescence; or the fever assumes a typhoid type, ending fatally.

VARIETIES.—As already stated, great differences are observed in the intensity of the symptoms of yellow fever, and also in the nature of those which are most prominent in different cases. Some patients are prostrated at once and die very speedily.

The named varieties are:—1. Algid. 2. Sthenic. 3. Hæmorrhagic. 4. Petechial. 5. Typhous. The several terms imply the prominent characters peculiar to each.

PROGNOSIS.—Yellow fever is always a terrible disease, but the mortality varies much in different epidemics. Death usually takes place from the fourth to the sixth day, but may be delayed to the ninth or eleventh day, or even to a much later period than this. It has been observed that many apparently hopeless cases recover, while others which seem to be mild prove speedily fatal; hence the prognosis is very uncertain. A concise list of favourable and unfavourable signs is given by Dr. Macdonald in Reynolds' *System of Medicine*, Vol. i, page 492.

TREATMENT.—Attention to all hygienic measures and rules of health is of prime importance. At the outset hot drinks and warm foot-baths have been recommended, with emetics and purgatives. Large doses of calomel or of quinine used to be given, but they have been proved to be injurious.

It is important to excite the excreting organs to act freely as soon as possible. Copious enemata containing turpentine are serviceable. Saline drinks may be given abundantly. The skin should be sponged, or the wet sheet may be employed if the patient is very hot.

Liquid food should be given in small quantities, with cool drinks and plenty of ice. Alcoholic stimulants, well diluted, are also valuable. Champagne is very beneficial. Various symptoms require attention, but especially vomiting. For its relief lime-water and milk, hydrocyanic acid, creosote, chlorodyne, and chloroform, have been found most useful. Great care must be exercised in the administration of opium or morphia, particularly if there is any tendency to suppression of urine. Chlorodyne is suggested as a substitute in order to procure sleep and relieve pain, hot applications or mustard poultices being also applied externally over painful parts. Hæmorrhages, collapse, and typhoid symptoms must be treated by the ordinary remedies. During convalescence quinine may be given.

CHAPTER XXV.

CEREBRO-SPINAL FEVER. EPIDEMIC CEREBRO-SPINAL MENINGITIS.

ETIOLOGY.—This complaint prevails as an epidemic, and presents the characters of an *acute specific disease*, but its *exciting cause* is by no means definitely made out. There is no reliable evidence that it is at all contagious. It has been attributed to the action of a malarial poison; to excessive fatigue; the use of unwholesome food, especially diseased grain; or exposure to cold. Among the chief *predisposing causes* are early age, especially from 15 to 30, the complaint being uncommon after 35 and very rare after 40, but not infrequent in children; the male sex markedly; and a cold season, most cases occurring in winter or early spring. Unfavourable hygienic conditions do not seem to have much influence. Cerebro-spinal fever is met with as an epidemic principally where young people are collected together, and it is particularly common among young recruits in barracks.

ANATOMICAL CHARACTERS.—The most important morbid changes observed in cases of cerebro-spinal fever are those indicative of inflammation of the membranes of the brain and spinal cord. There is hyperæmia of the scalp and of the structures within the cranium, the sinuses of the dura mater containing much dark fluid or softly-coagulated blood. There may be small hæmorrhagic effusions in connection with the dura mater. The sub-arachnoid space contains excess of serum, but the most striking appearance is due to the presence of more or less exudation here, both over the convexity and at the base of the brain, but it is much more abundant in the latter situation, the cranial nerves being often imbedded in it. The amount and characters of this material vary with the duration of the disease; in cases of very short duration it is generally in small quantity, whitish and soft; later on it becomes more abundant, yellowish or greenish, and somewhat purulent looking; while in prolonged cases it is again whiter and firmer, there being also more serum then. The brain-substance is too vascular and may be softened, especially in the neighbourhood of the ventricles, which contain in many cases a small quantity of purulent-looking fluid, or occasionally much serum.

The membranes of the cord present similar changes, there being a purulent fluid under the arachnoid, with exudation, which is almost entirely confined to the posterior surface.

Rigor mortis is well-marked. Post-mortem congestion rapidly sets in, and purpuric patches are usually visible. The blood is dark

and tarry-looking, and the muscles are of a deep colour
spleen, liver, and lungs are often much congested, and the
be signs of inflammatory complications. Purulent infiltra
the eyeball has been occasionally met with, as well as effus
the joints.

Symptoms.—In the great majority of cases cerebro-spin
is not ushered in by any premonitory symptoms, and the
is quite sudden, with a rigor or chill; faintness; intense he
causing the patient to cry out, and being more or less gene
sometimes localised, especially at the back of the head;
frequently epigastric pain and cerebral vomiting, the vomit
ters being generally of a bilious character; great restle
and pyrexia. The pupils are contracted. In a day or
pain extends to the back of the neck and then down the spin
increased in this locality by movement and pressure. Th
is drawn back, partly voluntarily in order to relieve pain
from spasm of the muscles. In three or four days distinct
spasms set in, there being often well-marked opisthoton
occasionally trismus, risus sardonicus, or strabismus. The
tory muscles may become involved, causing serious inter
with breathing. The skin generally becomes extremely s
and severe pains are felt in the limbs, these being aggrav
sometimes only produced by movements of the spine. At
mind is clear, but soon mental confusion is observed, follo
muttering delirium, and then by stupor, which in fatal cas
in deep coma. In rare instances epileptiform convulsions
or there may be hemiplegia, paraplegia, or signs of para
some of the cranial nerves. Amaurosis is occasionally
and deafness is not uncommon.

Early in the course of the disease herpes usually appears,
about the lips and face, but it may be on the limbs or
Other forms of eruption are sometimes seen, and the bo
comes more or less thickly scattered over with purpuric
bad cases, in some instances considerable patches bei
volved, which may become quite black or even gang
in such cases mucous hæmorrhages are also liable to
The degree of pyrexia varies much in different cases, but t
perature usually ranges from 100° to 103°, in some instance
to 105° or higher. It has no regular course, often presents
variations, but there is generally a slight evening exacer
The pulse rises to 100° or 120°, but is liable to considerable c
in frequency; it is sharp, weak, and wanting in tone.
respirations are hurried. The bowels are constipated a
abdomen is retracted. The urine may contain a large q
of albumen in severe cases; when stupor sets in it is retai
passed involuntarily.

A favourable termination of the complaint is indicate
gradual subsidence of the nervous phenomena, restoration
mental faculties, and a steady fall in temperature. Conval
is very slow, and headache usually continues for some time.
may only be partial restoration, the mind being permanen

paired, or some form of paralysis remaining; or death may take place after many weeks, from general marasmus.

Cases of cerebro-spinal fever present much variety in their severity and in their combinations of symptoms, and different writers have arranged them into corresponding groups or varieties.

Complications and Sequelæ. These are not uncommon, the chief being:—inflammatory affections of the eye-ball, especially of the right, which may end in suppuration and total destruction of the tissues; inflammation of joints ending in purulent accumulation; bronchitis, pleurisy, or pneumonia; pericarditis; and parotitis.

Prognosis. Cerebro-spinal fever is a grave malady, but the mortality varies in different epidemics from 20 or 30 to 80 per cent., the average being about 60 per cent. The early appearance of purpuric spots and the occurrence of hæmorrhages are very unfavourable signs. Death is most to be feared during the first few days, but it may take place after many weeks. The mortality is highest at the commencement of an epidemic; and amongst young children and persons over 30 years of age.

Treatment. If there is much depression at the outset, it is desirable to give small quantities of stimulants, and to apply heat externally. Subsequently the chief indications are to promote absorption of the exudation; to relieve the pain and spasms; to support the strength of the patient; and treat symptoms and complications as they arise. Mercury and iodide of potassium have been given with the view of aiding absorption, but the former drug seems to be quite inadmissible in the treatment of cases of cerebro-spinal fever. The application of a few leeches to the temples or behind the ears often relieves the headache. Ice should be applied constantly to the head and along the spine. In prolonged cases it has been recommended to blister the nape of the neck and spinal region. The most reliable remedies for relieving the symptoms are opium internally, or hypodermic injection of morphia; chloral; bromide of potassium in full doses; and belladonna. The patient must have nutritious and sustaining food throughout, and considerable quantities of alcoholic stimulants are frequently required. Enemata are often of much service for their administration, as well as for acting on the bowels. It is requisite to pay due attention to hygienic conditions. During convalescence tonics and good diet are necessary.

Chapter XXVI.

MALARIAL OR PALUDAL FEVERS.

1. On Malaria or Marsh-Miasm.

There are certain affections which have been almost universally recognised as being the result of the action of a malarial or telluric poison upon the system. Amongst these the most striking are fevers of an intermittent or remittent type, before considering which it is therefore requisite to indicate the main facts relating to malaria. Of the existence of such a poison there can be no doubt, though this has been denied by a few observers, some of whom have attributed the effects noticed to a chill; others to some electrical condition of the atmosphere.

1. *Origin and propagation.*—The malarial poison is ordinarily an emanation from soils more or less rich in organic matter, which are not devoted to the maintenance of healthy vegetation. The essential conditions for its production are—decomposition of vegetable organic matter; a certain temperature; with a certain degree of moisture. Without the first of these it cannot possibly arise. Very rarely are malarial diseases generated under a temperature of 60° F., and the heat must be of some duration. A this rises they become more prevalent and more severe, and hen they are very virulent in certain tropical climates. There must n be too much moisture, else the poison is absorbed by it; while it not formed if the atmosphere is dry.

The necessary conditions, as regards vegetable decompositi and moisture, are met with under the following circumstances 1. In marshes and swamps, unless the soil is peaty or constan overflowed with water, conditions which materially interfere w the development of malaria. 2. Where there is much vegeta matter in the soils of valleys and ravines, at the bases of mount ranges in tropical climates, in alluvial deposits, along the ba of tropical rivers, in old estuaries, deltas of rivers, &c. 3. Wh surfaces covered with much vegetation have been temporarily ov flowed, so as to be left moist. 4. During the draining of lal ponds, &c. 5. In sandy plains containing organic matter, if th is a subsoil of clay or marl, conditions often existing simultaneou in old river courses. Also in the lower chalk formations, wit subsoil of clay or marl. 6. In certain hard granitic or trap ro containing organic matter, such as fungi, especially if they are integrating. 7. In turning up the soil in the early cultivation land, digging canals, making railways, &c. 8. Where copi vegetation has been cleared away in dense jungles for purpose cultivation, sufficient being left behind to decompose. It frequen happens that the first result of attempts at cultivation of a new trict is the production of malarial diseases, which ultimately appear. 9. When tracts of land are from any cause allowed fall out of cultivation, especially if the soil is rich in organic m ters. 10. On board ship, where decomposing vegetable ma is mixed with bilge water; or where malarial mud has in way been accumulated.

The following conditions influence the development and p pagation of malarial affections:—1. *Season.* Usually they most prevalent towards the latter part of summer and in autumn, and many malarial districts may be visited without danger in the winter, which cannot be approached in the w season. They are particularly liable to occur after long-contin dry and hot weather followed by warm rains. In climates wl the summer is short, even though very hot, they are not preval

ıter is peculiarly protective, though it is said that the
admixture of salt water increases the emanations from
3. *Winds*. These frequently convey the malaria for
.ble distance along plains, and may thus be the means
ng malarial affections in places remote from a malarial
ɩo counteracting the good effects of the intervention of
On the other hand, a storm may drive away the poison

4. *Low districts* are more dangerous than those which
d, the malaria tending to cling to the earth. By the
ıes and hot air, however, it may be carried up moun-
;reat height, it is stated even as much as 2000 or 3000
lower rooms of houses are more dangerous than the
Trees. When in large numbers these afford decided
both by interfering with the propagation of the poison,
ping off the sun's rays from the soil; in some cases,
ıey seem to be injurious. Certain trees are said to
cially protective influence, particularly the eucalyptus
ıt this is doubtful. 6. *Mountains and hills* interfere con-
ith the dissemination of malaria. 7. *Time of the day*.
ıd evening dews augment the danger from malaria
probably from condensing the poison. It is highly
:o sleep in tents at night in malarial districts. 8. *The*
n some way renders the poison innocuous, for though a
sease may be raging outside it does not penetrate far
terior. 9. *Artificial heat* destroys malaria, if sufficiently
). *Individual susceptibility* is increased by certain circum-
.., recent arrival in a malarial district; fatigue and
from any cause; exposure to the full heat of the sun;
ıges of temperature and chills of all kinds; intemper-
sure on an empty stomach; over-feeding; mental ex-
nervous depression; and over-crowding. Some per-
r more susceptible than others. Young children and
are least subject to malarial affections, and males are

mixed with the decomposing vegetable material, the poison whi escapes seems to be more virulent.

3. *Mode of entrance into the system and effects produced.*—The pois is chiefly inhaled and absorbed by the pulmonary membrane; may also be taken up by the stomach, which it often seriou disorders, and possibly by the skin. It acts on the nervous syste and gives rise to fevers of an intermittent and remittent type; follo ed after a time by permanent organic changes, especially in the liv and spleen; and also various neuralgic affections. Certain oth disorders are attributed to it, such as diarrhœa, gastric derang ment, palpitation of the heart, pains in the limbs and joints, an norrhœa, as well as a general state of ill-health and a peculi malarial cachexia, with ultimate degeneration of the race. large number of males in certain malarial districts are said to impotent. Dysentery and hepatic abscess are very prevalent certain tropical malarial regions. Malaria imparts a peculi periodicity to the affections which it originates, and once they ha existed they are liable to recur on subsequent occasions indepe dently of the action of the original exciting cause, sometimes i deed appearing to arise spontaneously. Various affections te to assume a periodic character in malarial districts.

4. *Prophylaxis.*—The precautions to be taken by those who a obliged to reside in malarial districts may be gathered from wh has been already stated; everything must be avoided which i creases the individual tendency to malarial diseases, and eve means of protection employed so far as is possible, in arrangi a place of residence, &c. It is an useful practice to give ba daily, and garlic has also been used as a preventive.

II. INTERMITTENT FEVER—AGUE.

ETIOLOGY.—Ague is the malarial fever which prevails in this cou try, mainly in low marshy districts. Cases are also met with he in which the complaint has originated in foreign climates. On the disease has been excited, subsequent attacks may arise with any exposure to malarial influence.

ANATOMICAL CHARACTERS.—The spleen presents the most notal changes, being at an early period much enlarged from congesti softened, and sometimes pulpy. After a while it becomes perm nently hypertrophied and firm, constituting the so-called "ag cake." The liver is also congested and soft, and ultimat hypertrophied; albuminoid disease of this organ has been stat to be produced occasionally. The stomach and duodenum a often congested, and their mucous membrane softened; in so cases ulcers have been observed. In rapidly fatal cases the he is softened, and its tissue undergoes degeneration. Chronic Brigl disease is believed to be set up sometimes by ague. In persons w have resided for a long period in malarial districts, black pigm is often found in the spleen, liver, and kidneys. The blood unhealthy and may contain black pigment.

SYMPTOMS.—Ague consists of paroxysms of fever, runni

2. *Water*. Abundance of water is a protection against malarial affections, because it absorbs the poison. Hence they are temporarily diminished by long and heavy rains and floods. Any deep sheet of water, especially running water, affords some protection, and thus the intervention of a river may prevent the poison from passing from one of its banks to the opposite one. A ship at a little distance from shore is in comparative safety. Some believe that sea-water is peculiarly protective, though it is said that the occasional admixture of salt water increases the emanations from marshes. 3. *Winds*. These frequently convey the malaria for a considerable distance along plains, and may thus be the means of originating malarial affections in places remote from a malarial district, also counteracting the good effects of the intervention of water, &c. On the other hand, a storm may drive away the poison altogether. 4. *Low districts* are more dangerous than those which are elevated, the malaria tending to cling to the earth. By the aid of ravines and hot air, however, it may be carried up mountains to a great height, it is stated even as much as 2000 or 3000 feet. The lower rooms of houses are more dangerous than the upper. 5. *Trees*. When in large numbers these afford decided protection, both by interfering with the propagation of the poison, and by keeping off the sun's rays from the soil; in some cases, however, they seem to be injurious. Certain trees are said to exert a specially protective influence, particularly the eucalyptus globulus, but this is doubtful. 6. *Mountains and hills* interfere considerably with the dissemination of malaria. 7. *Time of the day*. Morning and evening dews augment the danger from malaria materially, probably from condensing the poison. It is highly dangerous to sleep in tents at night in malarial districts. 8. *The air of cities* in some way renders the poison innocuous, for though a malarial disease may be raging outside it does not penetrate far into their interior. 9. *Artificial heat* destroys malaria, if sufficiently intense. 10. *Individual susceptibility* is increased by certain circumstances, viz., recent arrival in a malarial district; fatigue and exhaustion from any cause; exposure to the full heat of the sun; sudden changes of temperature and chills of all kinds; intemperance; exposure on an empty stomach; over-feeding; mental exhaustion or nervous depression; and over-crowding. Some persons are far more susceptible than others. Young children and old persons are least subject to malarial affections, and males are said to be more predisposed than females. White races suffer more than blacks. It is stated that the use of drinking water from a malarial district may produce malarial diseases.

2. *Nature*.—Much doubt exists as to the nature of the malarial poison. It has been supposed to be a gas resulting from vegetable decomposition, but the most favoured view is that it is organic, consisting either of microscopic plants or their spores, or of animalcules. At present, however, neither chemical nor microscopic investigation has succeeded in demonstrating the nature of malaria. It has been suggested that there are different kinds of paludal poisons, but there is no proof of this. When animal matters are

mixed with the decomposing vegetable material, the poison escapes seems to be more virulent.

3. *Mode of entrance into the system and effects produced.*—The is chiefly inhaled and absorbed by the pulmonary membra may also be taken up by the stomach, which it often ser disorders, and possibly by the skin. It acts on the nervous s and gives rise to fevers of an intermittent and remittent type; f ed after a time by permanent organic changes, especially in th and spleen; and also various neuralgic affections. Certain disorders are attributed to it, such as diarrhœa, gastric der ment, palpitation of the heart, pains in the limbs and joints, norrhœa, as well as a general state of ill-health and a pe malarial cachexia, with ultimate degeneration of the rac large number of males in certain malarial districts are said impotent. Dysentery and hepatic abscess are very preval certain tropical malarial regions. Malaria imparts a pe periodicity to the affections which it originates, and once the existed they are liable to recur on subsequent occasions ind dently of the action of the original exciting cause, sometim deed appearing to arise spontaneously. Various affection to assume a periodic character in malarial districts.

4. *Prophylaxis.*—The precautions to be taken by those wh obliged to reside in malarial districts may be gathered from has been already stated; everything must be avoided wh creases the individual tendency to malarial diseases, and means of protection employed so far as is possible, in arra a place of residence, &c. It is an useful practice to give daily, and garlic has also been used as a preventive.

II. Intermittent Fever—Ague.

Etiology.—Ague is the malarial fever which prevails in this try, mainly in low marshy districts. Cases are also met wit in which the complaint has originated in foreign climates. the disease has been excited, subsequent attacks may arise w any exposure to malarial influence.

Anatomical Characters.—The spleen presents the most n changes, being at an early period much enlarged from cong softened, and sometimes pulpy. After a while it becomes p nently hypertrophied and firm, constituting the so-called " cake." The liver is also congested and soft, and ulti hypertrophied; albuminoid disease of this organ has been to be produced occasionally. The stomach and duodenu often congested, and their mucous membrane softened; in cases ulcers have been observed. In rapidly fatal cases the is softened, and its tissue undergoes degeneration. Chronic B disease is believed to be set up sometimes by ague. In person have resided for a long period in malarial districts, black pi is often found in the spleen, liver, and kidneys. The bl unhealthy and may contain black pigment.

Symptoms.—Ague consists of paroxysms of fever, r hrough certain definite stages, occurring at more or less regular ntervals, with intermediate periods of complete apyrexia.

The *invasion* is generally indicated by the ordinary symptoms premonitory of fever, which are noticed for some days before the disease declares itself, the pyrexia presenting well-marked remissions, with a periodic tendency. Sometimes the attack is sudden.

A *paroxysm* or *fit* of ague consists of three distinct successive stages, named respectively the *cold;* the *hot;* and the *sweating* stage.

1. *Cold Stage.* Ordinarily a fit is preceded by general uneasiness and languor, inaptitude for any exertion, headache, and loss of appetite. Soon the patient feels cold, first in the limbs, then along the back and over the body. The teeth begin to chatter, and finally the entire frame shivers. At the same time the general surface of the skin appears pale and shrunken, especially that of the face, the features being pinched and sharp. The tips of the ingers and lips look blue, and in severe cases the whole surface assumes a purplish hue. Cutis anserina is frequently observed. The patient often complains of pains in the back and limbs, and headache. The tongue is usually pale, moist, clean, and cool; appetite is lost, but thirst is a frequent symptom. Nausea and vomiting are not uncommon, with uneasiness and sense of weight n the epigastrium. There is a sense of dyspnœa, with hurried breathing, and often a dry cough, the expired air being cool. The pulse is usually frequent and small, and may be irregular.

The intensity of this stage varies greatly. There may be signs of serious depression or collapse, with a tendency to stupor or coma. ts duration ranges from a few minutes to three, four, or five hours.

2. *Hot Stage.* The transition to this stage may be sudden, but s generally gradual, there being alternate flushings and chilliness, or parts of the body becoming warm. When fully developed the skin feels burningly hot and dry, is red and tumid, and sometimes a patchy rash appears. The face is flushed, and the eyes are injected and sparkling. There is intense thirst, with dryness and heat of mouth, total anorexia, a white tongue, and sometimes nausea or vomiting. The heart and great arteries throb, and the pulse is generally strong and full. Respiration is more quiet than in the irst stage. Headache is always present, with a sense of throbbing, and sometimes more or less delirium, which may be very violent, or convulsions.

This stage lasts usually from three to eight hours, the extremes being from two to eighteen hours.

3. *Sweating Stage.* Perspiration breaks out first about the forehead, and then by degrees over the body. Its amount varies, but it s generally considerable, so that the bed-clothes are saturated, and sometimes even the bedding. In cases originating in certain malarial districts, the perspiration is said to have a peculiar sickly and most disagreeble odour. It continues to flow for some time, during which the pyrexia becomes reduced and the symptoms rapidly abate; the patient usually soon falls asleep, and awakes well or comparatively well. Along with the sweating there is a

critical urinary discharge, and not unfrequently diarrhœa.
sarca has been observed when sweating is deficient.

Intermission. At first a person suffering from ague may feel
convalescent during the periods intervening between the
oxysms, but soon more or less languor and depression i
perienced, with neuralgic pains and loss of appetite, whil
patient becomes pale and anæmic. After a while permane
ganic mischief is established, especially in connection wit
spleen, attended with serious symptoms, which will be des
when treating of splenic diseases.

Temperature. The course of temperature in ague is quite
racteristic, the paroxysm being marked by a rapid ascent;
and intense stationary period; and critical defervescence
temperature in the intervals being perfectly normal. There
rise as soon as, or even before, the cold stage begins; at f
is only slight and gradual, but soon becomes rapid, conti
during the hot stage and sometimes into the commencement
sweating stage. The temperature generally runs up to 1
107°, but may reach 108°, 110°, or even 112° in hot cli
When sweating begins there is generally a slight alt
rise and fall at first, but soon a steady fall sets in, of 2° or
every five to fifteen minutes, until the temperature becomes n
It is important to notice that even before the paroxysms are e
enced, and after they have apparently ceased, the temperatur
been observed to rise at the usual periods.

Urine. During the cold and hot stages water is increased,
diminishes at the close of the latter, and is very deficient
sweating is going on, so that the specific gravity rises. Urea
denly increases in amount as soon as the rise in tempe
begins, and this continues until the sweating stage sets in, w
rapidly or gradually diminishes, often falling below the n
A relation is said to exist between the amount of urea disch
and the temperature. Uric acid is also considerably in e
and urates are generally deposited at the close of the fit. Ch
of sodium is greatly increased, while phosphates are much d
ished. Albumen, blood, or casts are not unfrequently prese
the urine. In the intervals the state of the urine varies much
is not uncommonly alkaline. Urea is deficient as a rule.

TYPES AND VARIETIES.—The chief types of intermittent feve
those founded upon the length of the interval between the
oxysms, viz. :—1. *Quotidian,* in which there is a daily paro
with an interval of twenty-four hours. 2. *Tertian,* where a f
curs every other day, the interval being forty-eight hours
Quartan, a paroxysm taking place every third day, the in
being seventy-two hours. These are the usual types, but e
tionally the following are met with:—4. *Double quotidian*
Double tertian, a seizure occurring every day, but at different
or with different characters. 6. *Double quartan,* out of three
two having each a paroxysm, the third none. 7. *Duplicated*
there being two paroxysms one day, none the next. 8. *Erra*
irregular. Other very rare types are described.

The *quotidian*, which is the most common, has the longest paroxysm; this is said to occur earlier in the day, and to have the shortest cold stage but the longest hot stage. In the *quartan* variety, which is the least common, the conditions are just the opposite; the *tertian* being intermediate. Sometimes the fits tend to begin earlier or later each day, and thus ultimately one type may be changed into another, or the change may take place suddenly.

A paroxysm may present certain peculiarities. Occasionally one or more of the stages may be wanting. The phenomena are in rare instances limited to certain parts of the body; thus in paralysed patients they may be confined to the non-paralysed parts.

Certain forms of ague are also described depending upon the symptoms present, viz.:—1. *Sthenic*. 2. *Asthenic*. 3. *Pernicious* or *malignant*, the last approaching the remittent type, and only occurring in hot climates, being attended with delirium, coma, or an algide condition.

Complications and Sequelæ.—Persons suffering under the influence of malaria are very liable to pneumonia, which comes on rapidly, often involves both lungs, and is of a very dangerous character. This is particularly observed in patients returning from hot malarial climates to cold climates. The blood is also prone to undergo acute changes of a serious character, ending in marked anæmia with excessive formation of white corpuscles, this condition being accompanied with dropsy. Various neuralgiæ are apt to follow ague.

Prognosis.—Intermittent fever is not often directly fatal in this country. Some of its varieties are exceedingly grave, especially those classed as *pernicious*. The complications mentioned above are also very serious. If treatment has been long delayed, so that the malarial cachexia has become established, it is difficult to bring about a complete cure. The quartan type of ague is the most obstinate form to be got rid of. It must be remembered that those who have suffered from this disease are liable to future attacks, apart from any exposure to malarial influence.

Treatment.—1. *During the paroxysm*. In the *cold stage* the patient should remain in bed well covered with blankets, some form of dry heat being applied externally, and hot drinks administered. In this country nothing further is necessary as a rule. When there is much depression, diffusible stimulants are required, and a little opium may be given to relieve great restlessness. Persistent vomiting is best checked by giving an emetic of sulphate of zinc, with plenty of warm water. If this stage is greatly prolonged a hot-air bath may be employed. In the *hot stage* the skin should be sponged freely, and cooling effervescent or saline drinks be given. During the *sweating stage* nothing is necessary but to keep the patient covered, so as to prevent a chill.

2. *During the Intervals*. The great remedy at this time is *quinine*, and it rarely fails to bring about a speedy cure. There is much difference of opinion as to the mode in which it should be administered. By some it is recommended to give one large dose of 20 to 30 grains, either before or at the close of the paroxysm. In a

large number of cases which came under my treatment at the Liverpool Northern Hospital, I found most satisfactory results from the administration of 3 or 4 grain doses every four or six hours during the intermission, and therefore am disposed to adhere to this practice. In some cases it is said the stomach rejects quinine, and then it may be combined with a little opium, or administered by enema. The subcutaneous injection of the neutral sulphate of quinine has also been advocated. It is important to notice that the remedy must be continued for some time after the paroxysms have apparently ceased, *i.e.*, until the temperature has become quite normal. Various substances have been employed as substitutes for quinine. Of these the only reliable remedies are cinchona bark, cinchonine, and arsenic. The last is decidedly beneficial, and has the advantage of being cheap. It is best given in the form of Fowler's solution, beginning with four or five minims three times a day. The alkaline sulphites have been recommended.

Symptoms and complications may arise requiring special attention. They must on no account be permitted to interfere with the use of quinine. Possibly venesection may be indicated, but I have never met with a case necessitating it in this country. Adynamic symptoms must be treated by external and internal stimulation.

For the cachexia induced by ague, as well as the different neuralgic affections, quinine, iron, and arsenic constitute the most reliable remedies, and they may be advantageously combined. Phosphorus may also be found serviceable. The tincture of eucalyptus globulus has been highly extolled. Patients should immediately be sent from a malarial region to some suitable climate, care being taken to attend to all hygienic conditions, to give good food, and to see that the clothing is warm, especially if they have to undergo a change from a hot to a cold climate. Various mineral waters and baths may be useful, such as Carlsbad and Friedrichschall waters, and warm baths or Turkish baths.

The *preventive* treatment is that for malaria in general, and, if possible, residence in a malarial district should be immediately discontinued.

III. Remittent Fever.

Etiology.—The malarial fevers of hot climates often assume a remittent type, there being irregular exacerbations and remissions, the latter being less distinct if the fever is very intense. They vary much in their severity, and have received many local names.

There is no distinct limit between this class of fevers and those of an intermittent type, both being due to the same cause, but this is aided by a high temperature in originating remittent fever. One type sometimes changes into the other.

Symptoms.—There are generally premonitory signs, but the attack may be sudden. Gastric irritation is usually first noticed, there being uneasiness or oppression at the epigastrium, nausea, anorexia, with headache, general pains, and a feeling of languor. There may be some chilliness or rigors, but there is no *cold stage* of any duration, and the temperature rises immediately. The *hot stage* becomes very intense, the skin being burning and dry, the face flushed, the eyes injected, with intense headache, giddiness, restlessness, sleeplessness, and often delirium, which is sometimes violent. Vomiting and nausea are commonly present, the vomited matters consisting first of food, then of watery fluid, and finally of biliary matters. They may become brown or black. There is great oppression and weight in the epigastrium, with a furred tongue tending to dryness, parched lips, and intense thirst. The pulse is frequent, either full, or small and compressible.

The symptoms abate generally in from six to twelve hours, but may continue for twenty-four, thirty-six, forty-eight hours, or even longer. Some perspiration usually breaks out as improvement takes place.

The remission is of variable duration, and then an exacerbation sets in, of greater intensity than the first attack. The time and number of remissions differ in different cases. When the disease is established, there is almost invariably a morning remission. The exacerbation may begin at noon, declining towards midnight; or it may begin at midnight and last till morning. In severe cases there may be a double exacerbation, viz., at noon and midnight.

As the case progresses signs of intense adynamia may set in. Yellowness of the skin is common, and hæmorrhages sometimes occur: these symptoms associated with "black vomit" make a case of remittent fever to resemble specific yellow fever. Occasionally marked jaundice is observed. The spleen and liver are usually enlarged and tender. The urine is generally stated to be scanty, dark, and of high specific gravity. In India Dr. Maclean has noticed just the opposite characters. It is always acid and rarely albuminous. Urea is increased and uric acid diminished until convalescence is established.

The entire duration is from five to fourteen days usually. The terminations are in death from blood-poisoning or exhaustion; in recovery, usually ushered in by free perspiration, but sometimes taking place gradually; or by transition into an intermittent fever.

TREATMENT.—It is important to attend to hygienic conditions, and to have good ventilation. During the hot paroxysm cool drinks should be given freely, and, if necessary, cold applied to the head. External application of cold, by one of the methods recommended for hyperpyrexia, is most valuable. Vomiting must be checked by the usual remedies. As soon as the remission occurs *quinine* must be given in 10, 15, or 20 grain doses every two hours: if the stomach rejects it, enemata must be employed. This remedy is to be administered until the system has become saturated with it, and signs of "cinchonism" are evident. It is also to be used should any complications arise. A compound named Warburg's tincture has gained much repute in the treatment of remittent fevers.

All antiphlogistic remedies are to be deprecated, as well as the use of calomel, except as an aperient. It is desirable to keep the bowels well opened. Bland nourishing diet is necessary, and often stimulants are required in considerable quantities.

Chapter XXVII.

ON THE DIAGNOSIS OF ACUTE SPECIFIC DISEASES.

For several reasons it has seemed to me advantageous to treat of the diagnosis of acute specific diseases in a connected manner, and to devote a special chapter to the consideration of the subject. Obviously it is of great moment in ordinary practice that an accurate diagnosis of either of these affections should be arrived at as speedily and promptly as possible, and in the large majority of cases anyone possessing the requisite knowledge of their characters may come to a positive conclusion on this matter without hesitation or delay. At the same time it is always important to avoid carelessness or undue haste in forming an opinion. Not a few cases come under observation, more especially those of a febrile character, in which it is impossible at the outset to arrive at any certain conclusion as to their nature, and under such circumstances it is better to postpone the diagnosis for a shorter or longer period, watching the progress of events, and observing the phenomena which present themselves. In some doubtful cases it may be allowable and even desirable to give an opinion as to the probable nature of the disease, but it is a great mistake to venture upon any definite and dogmatic diagnosis on insufficient data.

Several of the acute specific disorders present such characteristic symptoms, that once these are fully pronounced there is no difficulty in recognising them. Others, however, are not so clearly marked off, and careful consideration may be necessary in order to discriminate them. I proceed therefore to point out briefly what are the chief facts which have to be known and taken into account in order to form an opinion as to the diagnosis of these complaints.

1. The diagnosis is materially assisted by a correct acquaintance with the etiology of each acute specific disease, and by the information elicited in connection therewith in any individual case. It is important to remember which of them are infectious, and which are constantly or may be exceptionally originated in other ways; the modes in which the contagium is conveyed in each disease, and the channels by which it enters the system; the conditions, both intrinsic to the individual and extrinsic, which affect its propagation; the period of incubation; and the effect upon the patient of previous attacks, whether these afford probable security from future attacks, or increase the predisposition to them.

The early recognition of a particular acute specific disease may be much aided by the fact that an epidemic is prevalent at the time; or by direct evidence that the patient has been exposed to infection in some way; or has been under the influence of some other well-known cause, such as malaria. It not uncommonly happens, however, that very careful enquiry is necessary in order to trace infection, as, for instance, in the case of typhoid fever and scarlatina; the contagium too may be so obscurely conveyed by nites, that it may be most difficult or impossible to track it to its gin; while it must be borne in mind that some diseases which ordinarily transmitted by infection, such as typhus and relapg fever, may probably be generated *de novo* under certain cirmstances. Hence even if a source of contagion cannot be covered, it does not necessarily exclude a specific disease ich may be suspected to be present. As an illustration of the lue of remembering the conditions which influence the occurnce of acute specific diseases, may be mentioned the effect of age d hygienic conditions with regard to typhoid and typhus fever spectively. Most of these complaints are as a rule only observed ce in the same individual, and hence in the case of any suspected er, it is well at the outset to find out what affections of this class e patient has previously suffered from, so that these may be exded by probability. At the same time the fact must be recognised at second and even third attacks of the eruptive fevers do somenes occur; while certain of the acute specifics, such as erysipelas, e predisposed to by previous attacks, and this may help in fixing on or at least suspecting one of these before the clinical phenoena are at all significant.

2. Obviously it is essential to have a complete and correct acaintance with the clinical history of each of the affections now der consideration, before a diagnosis can be made with any gree of certainty. This includes:—

a. Its mode of invasion.

b. Its more characteristic symptoms, particular attention being id to those which are presented at an early period.

c. The chief facts connected with the skin-eruption, in the case those diseases which are attended with such a phenomenon.

d. The degree of pyrexia, and course of temperature as indicated the thermometer, when this is at all significant.

e. Its ordinary course, duration, modes of termination, and morlity.

f. The varieties it may assume, so as to be prepared for any viation from the usual type.

g. Its ordinary complications and sequelæ. A knowledge of ese is useful in several ways in a diagnostic point of view. hus it may guard the practitioner against mistaking some cal mischief which he may have discovered, *e.g.* pneumonia, r the entire disease, when it is but a complication of some ver; it enables him further to be on the look-out for such morid conditions as are liable to arise in the course of or after ny particular fever; while the development of a certain special mplication or sequela may throw much light upon the nature of n otherwise obscure case.

3. Diagnosis of the specific fevers more especially, is greatly ided and facilitated by a clear understanding of the complaints hich they severally resemble and are likely to be confounded ith. In the first place it is requisite to bear in mind with regard each of them, which diseases of its own class approach it in its aracters, and are liable to be mistaken for it; and, secondly, other

febrile diseases which are more or less like it, whether dependent upon local mischief, or due to some deleterious agent in the system, such as rheumatic fever, pyæmia, etc.

It would only involve unnecessary repetition to recapitulate the points just indicated with reference to each acute specific disease, as they have been already considered in detail, and my main object in this chapter has been to sketch the kind of information required, and to suggest the line of reasoning to be adopted in order to form a diagnosis of individual cases of these complaints. I propose, however, first to make a few remarks respecting febricula; then to present in the form of a table the chief clinical features of the principal fevers prevalent in this country, and the diseases for which they are liable to be mistaken; and lastly, to notice briefly each of the more peculiar or less common specific affections.

DIAGNOSTIC TA

	TYPHOID FEVER.	TYPHUS FEVER.	RELAPSING FEVER.
MODE OF INVASION.	**Often very gradual and ill-defined. Patient cannot fix date. No marked rigors. May be only diarrhœa for some time.**	**Generally well-marked and may be very sudden. Usually marked rigors. Speedy prostration and high fever.**	**Generally remarkably sudden. Severe rigor. Great weakness.**
CHARACTERISTIC SYMPTOMS.	**Marked frontal headache, but other head symptoms not prominent, or only come on at a late period.** Abdominal symptoms, viz., pain and tenderness, especially in right iliac fossa; tympanitis; gurgling in right iliac region; diarrhœa, with peculiar stools; not uncommonly intestinal hæmorrhage. Enlarged spleen. No particular prostration. Epistaxis not uncommon. Tongue peculiar at first. Pulse liable to great variations.	**Great depression and prostration.** Dingy and muddy aspect of countenance, with dusky flush on cheeks, and dull heavy expression. Early and marked head symptoms and low nervous phenomena. Rapid tendency to typhoid condition. Pupils often much contracted.	**Sharp frontal headache. Severe pains in back and limbs. Pains in epigastrium and hypochondriac regions.** Bilious vomiting with retching. Jaundice frequently. Enlargement of liver and spleen. Peculiar aspect of countenance. No marked nervous Symptoms usually. Much debility, but not prostration. Pulse very frequent at an early period. Epistaxis and other hæmorrhages common.
SKIN-ERUPTION.	7th to 12th day; generally confined to abdomen, chest, and back; comes out in successive crops, each lasting 2 to 5 days; consists of minute rose-coloured spots, slightly raised, disappearing on pressure; only a few visible at same time; continue to appear until 28th or 30th day, or even later. Sudamina not uncommon.	4th or 5th day usually; first about back of wrists, axillæ, or epigastrium; spreads rapidly over body and limbs, but rarely seen on neck or face; all out in from 1 to 3 days; consists of: — *a.* irregular dusky-red subcuticular mottling; *b.* maculæ or mulberry spots, deepening in colour, and soon not fading on pressure; disappears from 14th to 21st day. Skin gives off peculiar odour. Sudamina less common.	No specific eruption. Sudamina may appear at crisis. Often fine desquamation of cuticle after crisis.

Febricula. The occurrence of a sharp febrile attack, unattended with phenomena characteristic of any other fever, and not dependent upon any discoverable local lesion, may be looked upon as indicative of febricula or synocha. The rapid rise of temperature is important, especially in distinguishing this complaint from typhoid fever. At the outset of course it is often impossible to say what may be the nature of the case; and there can be no doubt but that many cases of so-called febricula are really cases of pyrexia associated with some local morbid condition which has not been detected. The opinion has been advanced that under this term are included more than one form of specific fever, perhaps several, but the present state of knowledge certainly does not warrant any such assumption.

RINCIPAL FEVERS.

EASLES.	SMALL-POX.	VARICELLA.	ERYSIPELAS.
lion, and gener- al. Chilliness or ccasionally con-	Generally sudden. Often repeated and strong rigors. Rapid pyrexia.	Not marked.	Often gradual, with indefinite febrile symptoms.
pyrexia. Catar- nomena, viz., &c. Only slight at, if any. More tarrh of respira- sages, extending d, and increasing eruptive stage. much diarrhœa king.	High pyrexia. Uneasiness or pain in epigastrium. Nausea and much vomiting. Severe pain in back. Much debility and sense of illness. Fever rapidly abates when eruption appears, followed by secondary fever. Often symptoms pointing to implication of mucous surfaces.	Slight pyrexia, without special symptoms; or may be no symptoms at all.	No special symptoms at early period, but premonitory symptoms of other exanthemata absent. May be much fever. Often marked rigor before local phenomena appear. Objective signs may be preceded by subjective sensations, as heat, irritation; or by enlargement of lymphatic glands in the neighbourhood. In facial erysipelas may have epistaxis at outset. Severe symptoms during eruption, with tendency to typhoid condition.
enerally; first on ecially fore-head, eads to trunk and ften in three dis- ps on successive nsists of minute ts at outset, soon g to distinct pa- hich tend to form c or semi-lunar ; colour darker at of scarlatina; in same order in hours; followed t desquamation; or coppery dis- e may remain for e; much itching.	3rd or beginning of 4th day; first on face, especially on fore-head; spreads over body and limbs in a day or two, often in successive crops; consists of "pocks" going through stages of:-- *a.* small bright-red spot; *b.* hard, shot-like pimple; *c.* vesicle, becoming umbilicated; *d.* pustule, reaching maturation about 8th day; *e.* scab, which leaves reddish brown stain on separation, or pits. Hard inflamed areola forms. Very variable mode of arrangement and number. Swelling of face, &c. Intense itching. Disagreeable odour given off. Eruption may be on mucous surfaces.	Within 24 or 36 hours; first about shoulders and chest, extends over body and limbs, may be many on scalp, but generally few on face; comes out in successive crops for 4 or 5 nights; first bright-red, slightly papular spots, not hard; in few hours vesicular, large and ill-defined, superficial, not umbilicated, no inflamed areola; do not become pustular, but gradually opalescent and dry up or rupture 3rd to 5th day; usually few in number and scattered; as a rule no pitting left.	Usually within 2 or 3 days; generally on face and head; signs of rapidly spreading inflammation of skin from a point, usually in one direction, sometimes equally in all; much heat, redness, swelling and tension; followed by formation of vesicles or bullæ, which rupture or dry up; subsequent extensive peeling of cuticle; may end in suppuration, ulceration, or gangrene; inflammation liable to extend after apparently stopping; may assume erratic or metastatic character; or extend to mouth, throat, larynx, &c. May affect other parts.

DIAGNOSTIC TABLE OF

		TYPHOID FEVER.	TYPHUS FEVER.	RELAPSING FEVER.	SCARLATI
Degree of Pyrexia, and Course of Temperature.		Peculiar ascent; rise of 2° each evening, with morning remission of 1°, therefore daily rise of 1°; temp. finally reaches to from 104° to 106° in evening usually, with slight morning remission; decline gradual, indicated by more distinct morning remission, followed by slight evening fall, with very considerable morning remission; some time before evening temp. normal.	Regular ascent without any remission until 4th or 5th evening, up to 104°, 105° or higher, then usually slight morning remission and marked fall on 7th morning; subsequent rise, but not to former maximum usually; then continuous, with morning remission varying from $\frac{6}{10}$° to $1\frac{1}{2}$°; rapid decline, temperature becoming normal in from 12 to 48 hours.	Continuous ascent for 4 or 5 days; temp. at last reaches 104° to 108°; slight morning remissions; rapid fall at crisis to below normal, with subsequent speedy rise to former temp. or even higher; sudden defervescence again at second crisis.	Continuous til rash height; reaches may be higher; ing rem fervescen by crisis, or when eru gins to fade
Course, Duration, and Terminations.		Continuous. Duration usually from 3 to 4 weeks; rarely beyond 30 days Most cases end in recovery. No crisis, but defervescence gradual. Convalescence slow, and health liable to remain permanently impaired. Relapses not uncommon.	Continuous. Duration usually from 14 to 21 days. Most cases recover, but mortality varies in different epidemics. Generally marked crisis, followed by deep sleep and rapid improvement in symptoms. Convalescence usually comparatively speedy. Relapses exceedingly rare.	Peculiar course, viz., sudden crisis usually from 5th to 7th day, attended with profuse sweating and other phenomena, followed by complete or partial cessation of symptoms; from 12th to 17th day sudden relapse, with same symptoms as at first; second crisis generally in from 3 to 5 days; may be a series of relapses. Duration variable. Almost always recovery, but convalescence often very slow, with debility, anæmia, muscular and arthritic pains, &c.	Continuous often account mation. very often valescence be retard ous sequ cially with albu dropsy. relapse.
Diseases resembling.	Fevers.	Typhus fever. Relapsing fever. Febricula.	Typhoid fever. Relapsing fever. Measles at early period. Erysipelas. Febricula.	Typhus fever. Typhoid fever.	Measles. Diphtheria pox in the stage.
	Other diseases.	Acute tuberculosis. Tubercular meningitis. Pneumonia. Pyæmia. Renal disease with uræmia. Gastroenteritis. Chronic peritonitis with ulceration of the bowels.	Asthenic pneumonia, especially in old, feeble, and intemperate persons. Cerebral or meningeal inflammations. Certain cases of delirium tremens. Blood-poisoning from uræmia, pyæmia, or septicæmia.	Rheumatic fever. Gastric or hepatic affections.	Acute throat mations. Urticaria. A rash of scarla times cal cases.
Remarks.		Cases of typhoid fever are liable to be very obscure, and present considerable differences in their clinical history; care is therefore necessary in diagnosis. When there is persistent diarrhœa, always bear in mind typhoid fever and use the thermometer. Patients may walk about during the entire attack. The most important complications are perforation of the bowels and peritonitis. More or less bronchial catarrh is always present.	Typhus fever can be generally recognised without much difficulty. It differs from typhoid not only in the points indicated in the table, but also in frequently attacking persons beyond middle life, and being much influenced by unfavourable hygienic conditions, which probably may even originate the disease *de novo*. There is a great liability to hypostatic congestion.	Relapsing fever is most liable to be mistaken for typhus at first, but the differences indicated above ought to enable the diagnosis to be made. The two diseases are promoted by the same anti-hygienic conditions. Among the most distinctive complications are abortion and a peculiar form of ophthalmia.	Scarlatina several varieties. be no and cases sent symptoms other be of a nant ing is making very occur tims known tion re in

FEVERS (*Continued.*)

L	SMALL-POX.	VARICELLA.	ERYSIPELAS.
t up to temp. not 5°; morn- s slight, nt; defer- id crisis, oth day: be much lications.	**Rapid rise of temperature to 104°—106°; speedy fall nearly or quite to normal when eruption appears; rises again as the eruption maturates, and varies with the amount of this; temp. reaches 104° or 105° in a typical case; gradual defervescence: may be another elevation of temperature when desiccation occurs.**	No special course. Pyrexia usually slight; may be marked rise of temp. in the evenings.	Very variable course according to part affected. In facial erysipelas rapid rise of temp. When local inflammation appears may reach 104° or 105° on first evening; increases so long as inflammation extends, but usually reaches maximum on 3rd day; may be 106°—108°; generally evening exacerbations, but may be distinct fall; defervescence usually about 5th or 6th day of inflammation; as a rule by rapid crisis; temp. normal in 12 to 36 hours; may be more gradual. Temp. will rise with relapse or extension of inflammation: is much influenced by complications.
tion usu- ortnight. er. Ter- ally by y rarely	**Course and duration very variable.** Termination fatal in large proportion of cases, about 1 in 3. Recovery is gradual, and convalescence often much delayed.	Short duration. Never fatal, Generally speedy recovery.	Variable duration. Termination not uncommonly fatal. When favourable, usually marked crisis. Convalescence established in variable time.
n. Small : of erup- ver. In- invasion	Febricula. Varicella. Measles (in early stage of eruption.)	Small-pox.	Typhus fever.
tic exan- s.	Lichen, (at early period). Pustular syphilitic eruption.		Acute Eczema. Erythema.
ar without or without symptoms. malignant cult to re- diagnosis been suffi- ted in the at disease. be further this table.	Small-pox presents many varieties, especially as regards the eruption, and this is greatly modified by vaccination; it is even believed that there may be no eruption; malignant forms of the disease are also met with. Hence diagnosis may be difficult. Greatest difficulty lies in distinguishing mild cases from those of chicken-pox.		Cases of erysipelas are often very difficult to recognise at the outset. It might be suspected if there were febrile symptoms, without any of the premonitory signs of other fevers, or any symptoms pointing to local disease, especially if accompanied with any unusual and subjective sensations about the face or other parts; or if lymphatic glands seem to be inflamed. The fact of a patient having had previous attacks may help in foretelling a coming one.

DIPHTHERIA. The general symptoms; local throat-symptoms, with satisfactory examination of the throat, will in most cases enable this disease to be recognised. It may at first be mistaken for any acute sore-throat, or for scarlatina, extensive thrush, or herpes on the pharynx. In the last-mentioned vesicles may be seen, which cannot be removed; the pain is much more severe, but limited; and herpes is visible on the lips. When it involves the larynx diphtheria resembles croup, which indeed has been considered a form of diphtheria. Some asthenic cases may be difficult to recognise at first.

INFLUENZA is sufficiently characterised by its epidemic character; marked febrile symptoms, with great depression; and catarrhal phenomena. It might be confounded with simple catarrh.

HOOPING-COUGH. In the early stage this complaint cannot be diagnosed with certainty, but it might be suspected if the disease is epidemic; if the cough is of a violent spasmodic character; and if there is much pyrexia. Subsequently the peculiar fits of cough with expectoration are absolutely distinctive.

MUMPS. This affection is also very easily recognised as soon as the peculiar inflammation of the parotid gland sets in, running its special course. It might be mistaken for inflamed lymphatic glands in the neighbourhood. The metastatic inflammations which are liable to arise must be borne in mind.

GLANDERS—FARCY—MALIGNANT PUSTULE. When these diseases are fully declared, their diagnosis presents no difficulty. At the outset glanders may be mistaken for acute or subacute rheumatism, but the occupation of the patient might lead to the suspicion of glanders; while in this affection there is more prostration from the first, and the joints are not swollen or red.

HYDROPHOBIA is another quite peculiar disease, the symptoms of which are highly characteristic. The chief liability to error lies in the fact that a patient who has been bitten by a supposed mad dog may be imagining all kinds of symptoms simulating those of hydrophobia, especially if nervous or hysterical.

CHOLERA. During an epidemic of cholera, it is the safest plan to treat any case presenting its characters as being of this nature. The painless purging and vomiting, with "rice-water" stools; cramps; intense thirst; great restlessness; suppression of secretions; rapid collapse and peculiar appearance of face, are but too significant of the malady. A sporadic case often presents much difficulty, and it may be impossible to determine whether it is one of true cholera or not. Usually some cause may be found for the attack; it is less severe; the stools and vomited matters contain bile; more or less griping is felt; urine is not entirely suppressed; the duration is longer; and the mortality is much less. Cholera may set in so violently and under such circumstances as to simulate irritant poisoning; on the other hand intense gastro-enteritis due to poison or some other cause has been mistaken for cholera; and so has the collapsed condition resulting from a rupture of a gastric or duodenal ulcer.

CEREBRO-SPINAL FEVER is another very well-marked disease, characterised by the circumstances under which it arises; its sudden onset; high fever; and symptoms indicative of grave cerebro-spinal meningitis. The appearance of herpes or purpuric spots and hæmorrhages may also assist the diagnosis. The complaint might be mistaken at first for typhus, typhoid, or relapsing fever; and subsequently for tetanus; but there is more danger of its being confounded with other forms of meningitis.

Dengue—Plague—Yellow Fever—Remittent Fever. These diseases of foreign climates need but little special notice. The symptoms of dengue and plague have already been sufficiently described. Yellow fever and malarial remittent fever may resemble each other, both being frequently attended with a yellow skin and black vomit. The points of distinction are said to be as follows:—Yellow fever is contagious, has only one paroxysm, and is not periodic; a second attack is very rare; it cannot prevail at a temperature at which malarial fevers are often met with; hæmorrhages and albuminuria are very common, the latter being almost invariable; quinine has not the influence over the disease which it has in the case of malarial fever. Relapsing fever might possibly be mistaken for yellow fever, but it differs in its course; in attacking chiefly the poor and destitute; in the rarity of black vomit, and comparative infrequency of jaundice; and in being scarcely ever fatal.

Intermittent fever in this country is almost always readily recognised by its peculiar paroxysmal febrile attacks and course of temperature. Some difficulty might be experienced at first in distinguishing a case where there was no history of malarial exposure, which is not always easy to trace, but all doubt ought to be removed by watching the patient for a day or two. Cases of malarial cachexia might afford some difficulty in diagnosis.

B. CONSTITUTIONAL DISEASES.

Chapter XXVIII.

RHEUMATISM.

This term is applied to very different diseases; for convenience sake it will be expedient to treat of them all in the present chapter.

I. Acute Articular Rheumatism—Rheumatic Fever.

Ætiology.—The immediate pathological cause of rheumatic fever is the presence in the blood of a poisonous material, generated within the system by some derangement of the nutritive and eliminatory processes. This is generally presumed to be a normal ingredient of one of the ordinary excretions, only present in excess, the common belief being that it is lactic acid. The results of experiments seem to favour this view, the usual phenomena of rheumatism having been produced by injecting this substance into serous cavities.

Exciting causes.—The ordinary exciting cause is a sudden chill, induced by exposure to cold and wet; sitting in a draught when heated or perspiring; neglecting to change wet clothes, &c. In not a few instances no definite cause can be fixed upon, and it is quite conceivable that processes may go on gradually in the system which tend to generate an amount of the poison sufficient to produce the complaint. Errors in diet, suppression of menses, and other disturbances have been ranked as causes. Scarlatina seems to lead to rheumatism sometimes, probably by interfering with excretion.

Predisposing causes.—Acute rheumatism is distinctly a hereditary disease. It chiefly attacks persons from fifteen to thirty-five, but especially from sixteen to twenty years of age, but no age is exempt. Previous attacks decidedly increase the predisposition. More cases are met with among males, and in the lower classes, on account of greater exposure to the exciting causes. Climate and season have considerable influence, the affection occurring mainly in temperate but very moist climates, and where there are sudden changes in temperature. It is far less common in tropical and very cold countries. A large number of cases are observed in the eastern counties of England. The same conditions influence the prevalence of the complaint at different seasons. A state of ill-health from any cause is said to predispose to rheumatic fever, and also mental depression or anxiety; but many individuals are attacked when in apparently perfect health. Joints which are much used, or which have been injured, are particularly liable to become affected.

ANATOMICAL CHARACTERS.—The morbid changes associated with acute rheumatism are chiefly evident in fibrous, fibro-serous, or synovial structures. A variable number of the joints present signs of acute inflammation. The synovial membrane is very vascular, thickened, and relaxed; there may be a deposit of more or less lymph, and the joint contains a moderate quantity of fluid effusion, chiefly serous, but having flakes of fibrine and cells floating in it, the latter often resembling pus-cells. The tissues around the joint are much infiltrated with fluid. In cases of long duration pus may form, and the cartilages sometimes become eroded. The sheaths of tendons may be inflamed, and occasionally contain a purulent fluid. The muscles are often dark, soft, and infiltrated.

In the majority of cases the morbid appearances characteristic of pericarditis, endocarditis, or myocarditis are visible. Fibrinous vegetations are common in the heart, even when no inflammation exists. Pleurisy and pneumonia are also not unfrequently present; and, rarely, peritonitis or cerebral or spinal meningitis.

The blood contains excess of fibrin, and becomes buffed and cupped during coagulation. The solids generally are diminished, but are in excess in the serum. It is doubtful whether lactic acid can be detected in the blood.

SYMPTOMS.—An attack of rheumatic fever may set in gradually, being preceded by a general state of ill-health for some time; but usually the invasion is prominently marked by chills or occasionally distinct rigors. These are followed by pyrexia, and soon the joints or other structures are affected.

When the disease is established, the symptoms are in most cases very characteristic. The patient complains of general soreness and stiffness, and presents an aspect of pain and suffering, combined with restlessness and weariness, but is unable to move on account of the pains in the joints, being often quite helpless. Usually there is copious perspiration, the patient being bathed in sweat, which has a peculiarly sour or acrid smell, and is usually very acid in reaction. Sudamina are not uncommon, and may be extremely abundant, coming out in successive crops. There are the ordinary symptoms accompanying pyrexia. The pulse is generally full and strong. The tongue is thickly coated, with much thirst, anorexia, and constipation. The urine is markedly febrile, deposits urates abundantly, and sometimes contains a little albumen. Patients cannot sleep on account of the pain they suffer, but there are no particular head symptoms as a rule. Occasionally slight delirium is observed.

The general symptoms are not always in proportion to the extent of joint mischief. In some instances they assume a typhoid character.

It is the middle-sized joints which are most commonly attacked in rheumatic fever, viz., the elbows, wrists, knees, and ankles, but the other articulations are by no means exempt. Usually several are involved in succession, the complaint showing an erratic tendency, and often the symptoms subside in one articulation as they appear in another, but several may be implicated together. The same joint may be attacked more than once in the course of the disease. A disposition to symmetry is frequently noticed.

An affected joint is more or less red, either uniformly or in patches, swollen, and hot. The amount of enlargement varies, and it is due partly to infiltration of the tissues around the joint, partly to effusion into its interior. The skin sometimes pits on pressure. There is considerable pain and tenderness, which is aggravated at night; and any movement causes much distress. In character the pain is dull and aching as a rule, being often so severe as to make patients cry. Frequently the suffering is less when the swelling is considerable.

Temperature. The *ascent* usually lasts about a week, but it may be longer or shorter. The temperature in most cases ranges from 100° to 104°. The *stationary period* varies greatly in duration; there is generally a considerable difference between morning and evening temperature. *Defervescence* is also gradual and indefinite in most cases, *crisis* being rare. The implicated joints may indicate a higher temperature than other parts. It is in cases of rheumatic fever that hyperpyrexia is most frequently observed, a remarkably sudden rise in temperature taking place, attended with grave symptoms, viz., severe rigors, violent nervous symptoms, sometimes jaundice, diarrhœa, or hæmorrhages, death usually speedily ensuing. The temperature may reach 109°, 110°, 112°, or more, and continues to rise after death. Irregularities in temperature are very common in rheumatic fever, even apart from any complications, and the latter are often not indicated by the thermometer in this disease. There is frequently a disproportion between the temperature and the pulse.

A *subacute* variety of rheumatism is by no means uncommon, especially in hospital practice, which is very troublesome. There is but slight pyrexia, and one or more joints are affected for a long time, with but little change except that occasional exacerbations are liable to occur from slight causes or without any evident cause. The joints are not much deformed, nor are they structurally altered to any extent. The general condition is usually much below par.

COMPLICATIONS.—In most cases certain internal organs and structures are implicated in the course of a rheumatic attack, and the resulting affections are ordinarily classed as complications, but in reality most of them are parts of the disease, and they may exist without any joint affection. At present they will be merely enumerated, as their symptoms and signs are described in other parts of this work, but it must be mentioned that they may come on very insidiously, and should therefore be constantly watched for, especially those connected with the heart, this organ being examined at least twice daily. These complications must necessarily influence greatly the progress of a case. They include—1. Cardiac affections, viz., pericarditis; endocarditis with consequent valvular disease; myocarditis; and the formation of fibrinous deposits in the heart. 2. Pulmonary affections, viz., pleurisy, pneumonia, bronchitis. 3. Rarely peritonitis. 4. Cerebral and spinal meningitis very rarely. The cardiac affections are by far the most common, and are especially frequent in the young, being met with in cases of all grades of severity.

Choreiform movements sometimes complicate acute rheumatism, or even a distinct attack of chorea, especially in children. The relation between them is a matter of doubt. It is supposed that the chorea is due to the plugging of the small vessels of some part of the brain with particles of fibrin from the cavities of the heart. Rheumatic subjects are liable to serious inflammations in connection with the eye, viz., ophthalmia, sclerotitis, or iritis.

DURATION AND TERMINATIONS.—The duration of rheumatic fever is exceedingly variable, but favourable cases generally are convalescent within from three to six weeks. Relapses are frequent. The termination in the great majority of cases is in recovery, but permanent organic mischief often remains behind. Sometimes stiffness of joints continues for a considerable period, or they may become chronically affected; they are also liable to subsequent neuralgic pains. Death generally results from internal complications.

Diagnosis.—Gout is the chief disease from which rheumatism has to be distinguished; the points of difference will be considered under gout. Articular rheumatism has also to be diagnosed from other forms. It may be simulated by erysipelas, pyæmia, trichinosis, dengue, or the early stage of glanders. It must be remembered that in an attack of acute rheumatism the joints may not be implicated.

Prognosis.—As regards life and death the prognosis is very favourable, but in many instances it is grave with respect to the future condition of the patient, on account of the organic mischie remaining. The chief indications of danger are a very high temperature or one remaining high for some time: severe nervous disturbance; adynamic symptoms; extensive complications about the heart or lungs; cerebral or spinal meningitis; deficiency of excreta. Chorea is considered to be a highly dangerous complication, especially when accompanied with dysphagia.

Treatment.—The indications for managing a case of rheumatic fever may be stated as follows:—1. To study the general comfort of the patient, and protect in every possible way from exposure. 2. To encourage free excretion. 3. To get rid of or neutralize the poison in the blood, if this can be effected. 4. To attend to the oints. 5. To relieve other symptoms. 6. To use every means for preventing complications, and treat them as they arise.

Of course it is desirable that a patient suffering from rheumatic ever should recover as speedily as possible, but it is a matter of much greater consequence that the attack should be passed through without any permanent organic mischief being left behind, than hat convalescence should be established within this or that number of days or weeks.

General management. The patient should be placed in a comfortable bed, between soft blankets, and should wear a flannel shirt, which must be frequently changed, the limbs being made as comortable as possible by means of pillows. It is important to avoid anything like a chill, hence the bed should be carefully protected rom all draughts, and patients should not be allowed to throw off he bedclothes, which they are much inclined to do. It is my pracice to wrap up all the joints, whether affected or not, in cotton wool, and also to place a thick layer of this over the front of the chest. The shirt may be cut in such a way as to make a kind of window over the region of the heart, by drawing aside which this egion may be examined without disturbing the patient or exposng much of the chest. The wool must be frequently renewed, the urface being dried before each fresh application is made.

The diet ought not to be too low, but should consist of a good quantity of beef-tea and milk, regularly administered. Lemonade or barley-water should be freely allowed as a drink, as well as ice to suck. Alcoholic stimulants are not required in ordinary pracice as a rule; in hospital practice, however, patients often need a little wine or brandy, and sometimes considerable quantities are required if there is a tendency to much debility and prostration. The bowels should be kept regularly opened.

Therapeutic treatment.—Observations have been made by Sir W. Gull and Dr. Sutton, as well as others, with the view of proving that rheumatic fever runs as favourable a course without as with medicines. Possibly this may be true if the measures already mentioned are carefully attended to. At the same time a tolerably extensive experience would lead me to attribute unmistakeably good results to the *alkaline treatment.* Whether it shortens the course of the disease or not it is impossible to say, but it certainly appears to have an influence over the joint-affection, and I am inclined to think that it tends to prevent the heart structures from becoming involved. This statement is founded on the fact that at the Liverpool Northern Hospital, where a large number of these cases were admitted, this was part of the treatment usually adopted, and heart complications were very exceptional, provided they were not present at the time of admission. The bicarbonate of potash is what I usually employ, either given in doses of ʒ ½ to ℈ ij every two to four hours; or ℥ ½ or more being dissolved in a quart of barley-water, and administered as a drink during the twenty-four hours. Much larger doses are recommended by some practitioners; while others prefer certain vegetable salts, such as the citrate or tartrate, which may be made into a pleasant drink.

Opium is another remedy of great value. It is best given in the solid form, in doses of one-fourth of a grain to a grain every three or four hours, according to the indications present. It not only relieves pain, procures sleep, and sustains the nervous system, but it also calms the heart's action, and thus by inducing rest for this organ tends to prevent cardiac inflammations. Morphia is also very useful, and it may be administered by subcutaneous injection.

Some of the numerous other plans which have been advocated for the treatment of rheumatic fever require notice.

The salts of soda are preferred by some practitioners to those of potash. Nitrate of potash has been much used, in quantities of from ℥ ½ to ℥ i in the twenty-four hours. Iodide of potassium, phosphate of ammonia, benzoates, and various other salts have also been tried. Lemon-juice has been much recommended, in quantities of from ℥ iij to ℥ xij or more in the twenty-four hours. Having seen it employed in several cases, it did not impress me favourably. Some prefer quinine or cinchona bark in full doses; the former may be conveniently combined with alkalies, as advised by Dr. Garrod. Dr. Reynolds has found tincture of steel efficacious. Potassio-tartrate of iron has also been well spoken of. Many practitioners use colchicum, but it is of doubtful value in rheumatism. Certain remedies which act powerfully upon the heart have been employed, viz., aconite, digitalis, and veratrum viride, especially the last-mentioned. They may have the effect of diminishing the tendency to cardiac inflammations, but require careful watching. Recently trimethylamine has attracted attention. Tincture of actæa racemosa has also been much recommended.

Herbert Davis treats acute rheumatism by blistering each as it becomes affected, the blisters encircling the limb, this followed by the application of linseed-meal poultices.

rious baths have been much advocated, viz :—the hot-air or r bath; different forms of cold bath; the wet pack; or ing with cold or tepid water.

al treatment. If possible it is desirable not to apply anything joints except cotton-wool, but in some instances the pain is eat that local applications must be made. As a rule warm yne fomentations or poultices give most relief, containing n, belladonna, or their active principles. To be of any use must be put on very hot, be well covered with mackintosh, and ently changed. I have often tried the local application of an ine solution, as recommended by some practitioners, but it not appeared to be of much service unless opium is added Cold compresses have been much commended. Possibly r three leeches might be advantageously employed occasion- Free blistering with liquor epispasticus certainly not un- ently gives speedy relief. It is not uncommon for a joint to a tendency to remain chronically affected after the general toms have subsided. If this happens, the application of a r or tincture of iodine may be first tried, but if a speedy effect t produced, I have found much benefit from strapping the arti- ion carefully and efficiently with ammoniacum plaster. If is much effusion, it has been suggested to tap the joint by s of the aspirateur.

e occurrence of hyperpyrexia indicates immediate recourse e employment of cold, as described under fever, with quinine ll doses internally, and large quantities of stimulants. The s successfully treated by Dr. Wilson Fox and others prove patients may be saved when in an apparently hopeless condi-

e treatment of the several internal inflammations will be again idered in their respective chapters. At present I will only ex- s the opinion that very rarely is any kind of bleeding justifi- , and calomel should never be given. Opium must be used caution if the lungs are involved, and free stimulation is then ssary. In cerebral or spinal meningitis ice should be applied lly.

uch care is needed during convalescence from rheumatic fever, el being worn next the skin, and every form of exposure ded. The diet should be improved gradually. The patient ld be kept under observation until quite convalescent, and have instructions as to how to guard against future attacks.

2. Chronic Articular Rheumatism.

MPTOMS.—This affection is common among old persons, usually ing on gradually as age advances, but occasionally following cute attack. The fibrous structures connected with and around articulations become thickened and stiff. Hence movement is impaired, and there is more or less dull aching pain, which is worse at night and during damp or cold weather. There are no particular objective signs, and the joints are not much altered in form. Probably this condition may be associated with chronic changes in the valves of the heart.

TREATMENT.—Patients suffering from chronic rheumatism should wear flannel next the skin, and avoid exposure or changes of temperature. Baths of various kinds are useful in different cases, viz., warm, vapour, hot-air, Turkish, cold, salt-water, sulphur, or alkaline baths. These may also be employed locally, and douches are very serviceable. Much good often results from systematic daily friction of the affected joints with some stimulating and anodyne liniment, such as camphor liniment with laudanum, tincture of aconite, or belladonna; also from shampooing and kneading. Local counter-irritation by blisters or tincture of iodine is sometimes beneficial. Good results frequently ensue from effectually strapping an affected joint with some plaster, such as emp. ammoniaci, red plaster, or Burgundy pitch plaster. It is always well to keep the joints bandaged. Patients should be encouraged to take a moderate amount of exercise. Galvanism is strongly advocated by some practitioners, in the form of the constant current.

The internal remedies which yield the best results are tonics, such as quinine and cod-liver oil, or tincture of iron. Iodide of potassium with decoction of bark is also useful, or it may be combined with quinine. Sulphur, guaiacum, sarsaparilla, actæa racemosa, and many other drugs have been recommended as specifics. It is often necessary to give some anodyne to relieve pain and procure rest at night, for which purpose chloral is very efficacious. Various mineral waters are sometimes serviceable, such as those of Buxton, Bath, Harrogate, Cheltenham, and some of the German spas. Vichy water may be tried. The diet should be nutritious and easily digestible. A small quantity of some stimulant is generally beneficial.

3. MUSCULAR AND TENDINOUS RHEUMATISM—MYALGIA.

The muscles are frequently the seat of a very painful affection, supposed to be of a rheumatic character, probably also involving the fibrous structures.

ETIOLOGY.—The *exciting cause* of muscular rheumatism is either exposure to cold and wet or to a direct draught of air; or excessive exercise or strain of the muscles. It is usually met with in adults, and some forms of it are most common among labouring men. One attack predisposes to another. Gout seems to increase the tendency to the complaint.

SYMPTOMS.—In most cases the first attack is acute, and it often comes on quite suddenly, or sets in during the night. The symptoms are pain in the affected muscles, some tenderness, considerable stiffness, with difficulty of movement, by which the pain is much increased. The degree of suffering varies considerably, but it may be intensely severe; sometimes the pain is only felt on moving the affected muscles. In acute cases heat frequently increases it, and it is also worse at night, so that patients suffer more when in bed. Steady pressure in many cases gives relief. There may be a tendency to spasm of the muscles. There are no objective signs, except that it is evident the patient keeps the involved structures as much at rest as possible. Pyrexia is absent, but there may be slight constitutional disturbance due to the pain and want of sleep. No tendency exists towards any cardiac inflammation.

In the acute form the complaint only lasts a few days as a rule, but it often becomes chronic, or is liable to return. When it is chronic, heat generally relieves, while cold and damp weather aggravates the pain.

VARIETIES.—Muscular rheumatism may affect the voluntary muscles in any part of the body, and it is even believed that it may attack the involuntary muscles. Its most frequent and important seats, however, are as follow:—

1. *Cephalodynia* or rheumatism of the scalp, which is attended with a form of headache, increased on moving the muscles, with much soreness on pressure.

2. *Torticollis, wry-neck,* or *stiff-neck.* This is a very common variety, involving the muscles of the neck, especially the sterno-mastoid. Usually it is limited to one side, towards which the neck is more or less immovably twisted, great pain being experienced on attempting to turn in the opposite direction. The muscles at the back of the neck may be implicated.

3. *Omodynia, Scapulodynia, Dorsodynia.*—These forms are very commonly observed, especially among labouring men, the muscles about the shoulders and upper part of the back being affected.

4. *Pleurodynia* or *Rheumatism of the chest-walls.*—The muscles of the chest are very often implicated, especially those of the left side. The intercostals, pectorals, or serratus magnus may be involved, and it has appeared to me that the pain is frequently seated over the interdigitations of the serratus with the external oblique. It is very commonly situated in the left infra-axillary region. It may be exceedingly intense, and is increased by any movement which brings the muscles into play. Respiration is imperfectly carried on on the affected side, and such acts as coughing or sneezing cause much distress. Not unfrequently the chief pain is localized in a point, and is of a catching character, while pressure on this point increases it, though diffused pressure with the palm may give relief. In other instances it alters its position. This affection simulates pleurisy, but is at once distinguished from it by careful physical examination. It often comes on as the result of cough, and both sides may be then affected; this is frequently observed in phthisical patients.

5. *Rheumatism of the abdominal walls* is an exceedingly painful complaint, and may be mistaken for peritonitis. It not unfrequently results from straining during cough.

6. *Lumbago.*—The muscles and fasciæ in the lumbar region are among the most common seats of muscular rheumatism. It may

set in with peculiar rapidity, and is usually very severe. Gen both sides are affected. There may be constant aching pain this is increased greatly on any attempt being made to brin muscles into action, and then becomes of a sharp, stabbing ch ter. The patient keeps the spine quite stiff, and generally a bent forward; any attempt to stand erect or still more to g from the sitting posture aggravates the suffering greatly. S times the patient cannot stir in bed. Pressure intensifies the considerably, and so does heat in many cases.

In addition to these varieties, muscular pains are common en in the limbs in different parts. Sometimes cases are met w out-patient practice, in which the plantar fascia and muscles to be involved. The diaphragm is occasionally the seat of matism, which causes much distress. The muscles of the eye may also be affected.

TREATMENT. The first indication is to keep the affected mu at rest, and in many cases this is all that is required. I treat rodynia by firmly strapping the affected side by means of b strips of plaster extending from mid-spine to mid-sternum (as be more fully described under pleurisy), and this rarely fa give complete relief. In lumbago also the application of a piece of emplast: roborans firmly across the back, and ove a flannel bandage passing twice round the body, always a great comfort. In acute cases warm anodyne fomentation frequently useful, or turpentine fomentations. Dry heat doe generally answer well, as it increases the pain, but sometin persevered in it does good. Gentle friction is often beneficial lumbago the subcutaneous injection of a small quantity of mo generally affords considerable relief. Internally the admin tion of bicarbonate of potash with iodide of potassium see answer best. An opiate may be necessary to relieve pain. I ing free diaphoresis by giving a warm drink and then wra up the patient in blankets, or by the use of a vapour-bath, in cases brings about a speedy cure. In rare instances it mig advisable to take away a little blood locally, by leeching or ping.

In chronic cases the internal remedies which do most goo iodide of potassium, quinine, and chloride of ammonium. Sul guaiacum, arsenic, mezereon, various balsams and resins are used; and likewise colchicum, if there is any gouty tend Tincture of actæa racemosa has been much vaunted in the ment of lnmbago. Flannel should be worn next the skin. pressure, cold compresses, friction with stimulating and an liniments, the application of sinapisms or blisters, and local ba douches with shampooing, constitute the chief local remedies are found efficacious in different cases of muscular rheuma The use of the continuous galvanic current is sometimes att with marked success. It may be advisable to have recour subcutaneous injection of morphia daily for a few days. puncture; the use of Corrigan's irons; or ironing over the aff part with a common flat-iron, a piece of brown paper being p next the skin, have proved beneficial in some cases.

4. Gonorrhœal Rheumatism.

Symptoms.—During the course of gonorrhæa, especially in young d plethoric persons, an affection of the joints is liable to set in the result of exposure, the knee-joint being that most commonly acked. The ankles, feet, or hip-joint are also not unfrequently plicated. There is considerable pain, with a tendency to much ısion and exudation, which gives rise to great tension and swel- g, but suppuration does not occur. The inflammation is very t to recur, and to lead to permanent changes in the joint, which y remain stiff for a long time, with a crackling sensation on vement; or destruction of the cartilages and anchylosis may sue. This complaint may become chronic. It is accompanied much constitutional disturbance.

Treatment.—The affected joints must be kept at rest and well nented. When the knee-joint is implicated, the limb should be ended on a splint, as it is apt to become bent. In the acute ge Dover's powder must be given, in addition to the ordinary nedies for gonorrhœa. Afterwards iodide of potassium is use- with tonics and stimulants if the patient is weak. Friction, mpooing, and movement of the joint must be carefully practised en the acute symptoms subside. It might be useful to strap the iculation.

5. Rheumatoid Arthritis—Arthritis Deformans.

Etiology.—This is a curious form of joint inflammation which ds in great deformity. It occurs in those who are debilitated and ose circulation is languid. Most cases are met with between enty and forty years of age, and among females. The com- int is chiefly observed among the poor who have lived badly, t may attack those who are in good circumstances. It is often ced to cold or damp, or sometimes to injury, but there may be obvious cause. It is doubtful whether it is at all hereditary.

Anatomical Characters.—At first there is redness of the synovial mbrane, and increase of synovia. After a time the capsular ament becomes greatly thickened, irregular proliferations form- g, and the synovial fluid becomes much diminished. The internal aments may be destroyed, leading to dislocation. Within the iculation fibrous bands form, and there may be cartilaginous or ny masses. The interarticular fibro-cartilages break down and appear, and also the cartilages covering the ends of the bones, the ter becoming smooth and eburnated to a greater or less extent, ing also enlarged, sometimes considerably, and either regular more commonly very irregular, owing to the growth of osseous otuberances. There is no deposit of urates.

Symptoms.—Rheumatoid arthritis may be acute or chronic. In former case several joints are involved, but there is no erratic ndency, such as is observed in ordinary rheumatic fever. Py- xia is present, but there is no profuse sweating, nor does the heart become implicated. In the chronic variety one joint is first affected with a little pain and swelling, but it recovers; in a short time it is again attacked, and remains permanently altered, becoming gradually worse. Other joints are then involved in succession, until all those of the limbs may be observed in various stages of alteration, and even the temporo-maxillary and upper cervical articulations may be implicated. They become rigid, motionless, and either permanently bent or extended; there is more or less distortion and nodulation, with contraction and wasting of the muscles, tbe patient being finally completely crippled. At first there may be signs of fluid in a joint. In some cases dislocation takes place. The pain may be very considerable, especially at night. There are no special constitutional symptoms, but the patients are often weak, anæmic, and wanting in tone. The hands are usually crippled before the feet. On the former also little nodular thickenings of the epiphyses of the phalanges, "digitorum nodi," are sometimes met with, especially in connection with the terminal phalanges, which are generally supposed to be due to rheumatoid arthritis, but others believe them to be gouty.

Other parts are occasionally involved in this disease, viz., the sclerotic, internal ear, or the larynx.

Diagnosis.—This disease has to be distinguished from gout; acute or chronic articular rheumatism; and gonorrhœal rheumatism. The marked structural changes and deformity distinguish it from ordinary chronic rheumatism, as well as from the gonorrhœal form, the latter also having a different history. The diagnosis from acute rheumatism and gout will be pointed out after the latter affection has been considered.

Prognosis.—Acute cases if properly treated may recover. If the disease is chronic and advanced some improvement may be effected, but not much as a rule.

Treatment.—Patients suffering from rheumatoid arthritis need a sustaining plan of treatment, which must be persevered in. The general health requires every attention, the diet must be very nutritious and easily assimilable, and wine or some other form of stimulant is decidedly beneficial. Warm clothing, an equable climate, a pleasant occupation, and moderate exercise, with daily baths, are to be commended.

Iron and quinine with cod-liver oil are the most efficient internal remedies. Syrup of iodide of iron, iodide of potassium, arsenic, guaiacum, actœa, and many other medicines have been favourably spoken of. Strychnine or nux vomica may be tried if the muscles have wasted much. Different mineral waters are sometimes beneficial, such as those of Bath and Buxton.

In early cases local counter-irritation is decidedly useful, but it does not produce much effect after a time. In a case under my care free bathing with salt and water followed by friction seemed to do most good; systematic strapping of the joints, friction with various liniments, shampooing, and careful movement may also be attended with benefit. Galvanism might be of some service.

CHAPTER XXIX.

GOUT—PODAGRA.

Y.—Gout is a markedly hereditary complaint, and this is rtly in its development at an earlier age. It is rarely under thirty years of age except in hereditary cases; attacks occur between thirty and thirty-five, and the es not often commence late in life. Males suffer much females. Those who are of sanguine temperament, ple- d corpulent, are most subject; but thin, nervous, wiry re also liable to be attacked. Individuals who work in ecidedly prone to become gouty, and, on the other hand, ple readily suffer from lead-poisoning. Gout prevails cold and temperate climates, especially those which are changeable. Spring is the most favourable season for cks, and then autumn.

nbination of circumstances most conducive to the deve- f gout is indulgence in certain alcoholic drinks, with onsumption of food, especially animal food, and deficient vith general luxurious habits. It is thus frequently pro- *ovo*, being considerably more prevalent among the better well as among publicans, butchers, butlers, and others ble to indulge in these habits. There is a form of "poor luced by drinking much beer, while at the same time ly as regards food, but a hereditary tendency may be in some cases of this class.

nd malt liquors are more conducive to gout than spirits. stands first, then come burgundy, madeira, marsala, and he lighter wines are not so hurtful. Rum is said to be a ause of gout. Sweet and unfermented cider is also produce it.

hological cause of gout is now generally believed to be ce of excess of *uric acid* in the blood, in the form of *urate* is substance being generated in excess in consequence of above mentioned, and the kidneys being unable to is excess. During an acute attack uric acid may be n abundance in the blood serum, and in long-continued ses it may be obtained from this fluid at any time. It is in the fluid of blisters or serous inflammations, and in accumulations.

ting cause of a gouty fit may not be evident, or it may be xposure to cold or wet; slight injury; excessive exer- tigue; mental labour; violent or depressing emotions, ge or grief; over-eating or drinking, and indulgence in e food.

CAL CHARACTERS.—Gout is characterized by the deposit soda from the blood in various structures, especially in ing into the construction of the joints, and such tissues very vascular. This is accompanied with signs of inflammation. In an acute case there is increased vascularity, with swelling and effusion into and around the affected joint. Even in the first attack a deposit probably takes place, and this increases with each subsequent paroxysm. In an early case only the metatarso-phalangeal joint of the great toe is usually affected, but subsequently other articulations become involved, so that almost all may be finally implicated. The deposit first occurs in the superficial part of the cartilages, in the form of fine crystalline needles or prisms, forming a more or less close network and presenting different degrees of opacity. Subsequently the fibro-cartilages, ligaments, and synovial membranes are involved, the entire surface being more or less irregular, and covered with white, chalky-looking deposits, consisting of urate of soda. The synovial fluid may also contain crystals of the same. Owing to the infiltration of the ligaments, the articulations become stiffened or anchylosed. In long-continued cases the joints become ultimately greatly distorted, and the skin over them may be destroyed, exposing the chalky-looking masses. The periosteum and mucous bursæ may be also implicated, and some believe even bone itself.

Deposits are often found in various other parts, such as the external ear, eyelids, nose, larynx, &c.

The kidneys become altered, probably at an early period. At first there is a deposit of urate within the tubuli, which afterwards extends into the intertubular tissue. White streaks are seen in the directon of the tubuli of the pyramids, and at the extremities of the papillæ. Ultimately the organs become greatly contracted and indurated, as well as the seat of extensive deposit. This condition of the kidney will call for more detailed description hereafter.

Symptoms.—Cases of gout are divided into two classes, according as the symptoms are associated with the joints or with some internal organ.

1. *Regular* or *Articular gout.*—At first this is an *acute* affection, but after a time it tends to become *chronic.*

A. *Acute gout.*—The first attack often comes on without any premonitory indications, but not always, and prodromata usually warn of the approach of subsequent fits. The most frequent precursory signs are derangements of the alimentary canal, with heartburn, acidity, and signs of portal congestion; palpitation of the heart; nervous disturbances, such as headache, giddiness, disturbed vision, drowsiness and heaviness, irritability of temper, languor, restless sleep with unpleasant dreams, starting of the limbs, cramps in the calves of the legs or other parts; asthmatic attacks; profuse sweats; or changes in the urine, which becomes scanty with much deposit, or very abundant and watery. These symptoms are supposed to result from the presence of the poison in the blood. In some cases the patient feels unusually well, both mentally and bodily, before an attack. There may be some uncomfortable local sensations.

The onset usually takes place during the night, especially from 2 to 5 A.M. In the large majority of cases the metatarso-phalangeal articulation of the great toe is that first affected, generally on one side, but sometimes on both, or they may be attacked in succession. In some instances this joint is alone implicated during several attacks, but in most cases others soon become invaded, a number being affected during a gouty fit, either simultaneously or in succession, though the complaint tends to be limited for a considerable time to the smaller joints of the feet and hands. Exceptionally the knee or ankle is first affected, but very rarely the articulations of the upper extremity.

Characters of the joint-affection.—The subjective sensations are extremely severe. The pain rapidly increases until it becomes agonizing and unbearable, being described as burning, tearing, plunging, boring, or piercing. There is exquisite tenderness, so that the slightest touch cannot be endured. These sensations are usually much worse during the night, and remit during the day. Soon the joint becomes red and hot, and is much swollen, owing to effusion into its interior, the skin over it being tense and shining, and after a while there is considerable œdema, with pitting on pressure, some relief accompanying these objective signs. The veins also are enlarged. As the inflammation subsides, desquamation of the cuticle takes place, and troublesome itching is often experienced. Œdema may continue for some time.

It is in the early attacks and in full-blooded persons that the conditions above described are most marked. Subsequently the pain and other symptoms become greatly diminished, and in weakly individuals, especially females, the characters of the joint-affection are not nearly so prominent.

Constitutional symptoms of greater or less severity are present during a paroxysm of gout, being in proportion to the intensity of the local symptoms, and the number of joints involved. Chills or even distinct rigors are felt at the outset, followed by pyrexia, usually attended with perspiration. The urine is very scanty and dark, and deposits urates abundantly, of variable colour. Uric acid is absolutely deficient, though relatively in excess. The patient is very restless and sleepless, and not uncommonly suffers from cramps in the legs. The digestive and hepatic functions are much deranged. At the close there may be critical perspiration, diarrhœa, or abundant sediment of urates in the urine.

The duration of a gouty fit varies from four or five days to several weeks, in the latter case there being remissions or intermissions. It increases as the case progresses. Recurrence is a characteristic feature of gout, though it does not invariably happen. At first the attacks generally come on once a year, in the spring; then twice, in spring and autumn; and afterwards more frequently.

Some patients do not recover their usual health for a considerable time after a fit, others are much the better for it. Soon the affected joints become the seat of permanent changes.

B. *Chronic gout.* This term is applied to those cases in which the joints become permanently much altered in structure and form;

and where the attacks are frequent, as well as chronic in duration and intensity, indeed in some instances being never altogether absent; at the same time other structures becoming involved. The articulations become stiff, immoveable, enlarged, nodulated, and deformed, owing to the extensive deposit in their structures. The skin appears blue and congested over them, the veins being enlarged. Finally it may rupture, masses of urate being exposed, named "chalk-stones or tophi," which may be discharged as a yellowish-white substance, or suppuration and unhealthy ulceration is set up.

In course of time other structures are affected, such as tendons, bursæ, the periosteum covering the shafts of bones, aponeuroses, and the sheaths of muscles. Gouty abscesses may form in connection with these deposits. Small deposits may also be observed in the helix of the external ear, the cartilages of the eyelids, the nose, and the sclerotic. At first they are liquid, and when punctured a whitish matter is discharged, containing abundant crystals; ultimately they become solid and form little hard nodules or beads. These chalk-stones sometimes set up inflammation, and hence they are not always of uniform composition; a little phosphate of lime may be mixed up with them.

Patients suffering from chronic gout are almost always weak and wanting in tone. They may have a sallow and pale aspect; or are sometimes plethoric but flabby-looking. They suffer from various disorders of digestion, as well as disturbances about the heart, in the way of palpitation or irregular action, being also irritable or depressed and restless, and subject to cramps, twitchings, tic douloureux, and other nervous disorders. A peculiar grinding of the teeth has been noticed in gouty subjects. From time to time there may be a little feverishness. The urine is generally pale, of light specific gravity, deficient in solids, and often slightly albuminous; it sometimes contains casts, there being, in fact, permanent disease of the kidneys established. The skin is often subject to various eruptions, such as urticaria, erythema, eczema, psoriasis, prurigo, and acne. The nose is sometimes the seat of daily paroxysms of great heat and redness.

2. *Irregular, non-articular, misplaced,* or *retrocedent gout.*—These terms are applied to gout when it attacks internal parts, which it may do from the outset; or it is supposed it may recede suddenly from the joints, and involve internal organs by metastasis, then being specially called "retrocedent." The chief complaints usually attributed to gout are as follows:—

a. Nervous disorders, such as severe headache and vertigo; mental disturbance, the intellect being impaired, or delirium or mania setting in as the result of retrocedent gout; epileptiform seizures; various neuralgiæ and other morbid sensations; startings of the limbs, cramps, or local paralysis. It is believed by some that gout may lead to a form of meningitis. Apoplexy is common among gouty subjects, but it is probably due to the fact that the vessels are generally diseased. A gouty sciatica has been described, due to implication of the sheath of the sciatic nerve, which may extend up to the spinal cord and its membranes, and lead to their destruction.

b. Derangements of the digestive organs. The stomach is one of the organs most commonly affected. There may be actual gastritis; or merely a neurotic disturbance, indicated by sudden spasmodic pain of great intensity but relieved by pressure, with a sense of oppression, great anxiety and distress, and sometimes much prostration and collapse. Dysphagia is occasionally complained of. In some cases intestinal colic and diarrhœa arise from gout. There is often evidence of the liver being out of order.

c. Cardiac disturbance. There is no true gouty cardiac inflammation, though white patches on the pericardium and changes in the valves are frequently observed in chronic cases. The cardiac action is, however, liable to become gravely disordered, being weak, or very slow or rapid, or irregular or intermittent; at the same time the pulse is feeble and small, and there is a tendency to syncope or collapse. Painful or disagreeable sensations are experienced over the cardiac region, with a feeling of constriction, dyspnœa, and much anxiety.

d. Pulmonary affections. A form of asthma is often met with in gouty patients, and also bronchial catarrh, which is attended with much cough. Pulmonary congestion may arise, but inflammation is very uncommon.

e. Urinary complaints. The changes in the kidneys have been already alluded to. Chronic cystitis and urethritis are not infrequent, especially among old people. Gouty persons often suffer from gravel and calculus, and oxaluria is observed in many cases.

Diagnosis.—The chief points of difference between gout, rheumatism, and rheumatoid arthritis are shewn in the following table:—

	Gout.	Rheumatism.	Rheumatoid Arthritis.
1. *Hereditariness*	Very marked.	Less marked.	Doubtful.
2. *Social position of patients* . .	Among the better classes, or those who over-feed and drink.	Among the poorer and hard-working classes chiefly.	Among the poor and ill-fed.
3. *Age*	Very rare in early life. Most first attacks from 30 to 35.	Common in early life; chiefly from 16 to 20.	Usually from 20 to 40.
4. *Sex*	Much more prevalent among males.	More among males, but to less degree.	Chiefly among females.
5. *Mode of onset* .	Often no obvious cause of first attack, and this is frequently preceded by digestive derangements, and other premonitory symptoms.	Usually follows an obvious cause, viz., cold, and frequently no previous symptoms.	Exciting cause may be evident or not. Preceded by much exhaustion and debility in some cases.

	Gout.	Rheumatism.	Rheumatoid Arthritis.
6. *Joint-affection*	The smaller joints are most affected, especially the great toe; no erratic tendency. Local symptoms very intense, with much œdema, a shining appearance, enlarged veins, and desquamation after the attack. In time permanent enlargement with distortion, and deposit of urates.	Medium-sized joints most involved; erratic; symptoms less severe, and less œdema present; no enlargement of veins or desquamation.	All joints equally attacked; not erratic; symptoms are not severe, but tend to long continuance. Ultimately deformity is produced, but no deposit of urates in joints.
7. *General symptoms*	Pyrexia, variable in amount; much constitutional disturbance; considerable morning remissions.	Considerable pyrexia; more continuous.	Only slight pyrexia. Symptoms of debility.
8. *Perspiration*. .	No special characters.	Very profuse and acid.	No acid sweats.
9. *Course, duration, and progress.*	Early paroxysm of short duration; great tendency to recurrence, and to periodicity.	Attack of longer duration; much less tendency to recurrence; not periodic.	Subacute, and gradually progressive; often no complete intermission; not periodic.
10. *Complications*	Affects especially the stomach, brain, kidneys; also gives rise to nervous disturbance of the heart, but not inflammation.	Very liable to cardiac inflammations; also lung inflammations.	Nothing in heart or other organs.
11. *Uric acid in blood.*	Present.	None.	None.
12. *Tophi in auricle, &c.*	Present.	None.	None.
13. *Urine*	Deficiency of urates before and during the fit, followed by excess; albuminuria common; may have casts, indicating kidney disease.	Febrile; sometimes slight albuminuria.	No special characters.

Prognosis.—Acute gout is rarely immediately fatal, but when it attacks internal organs there is considerable danger. The complaint is always liable to return, but much depends upon the mode of living which the patient adopts. The prognosis is worse in proportion to the youth of the patient; the degree of hereditary tendency; and the frequency of the attacks. Chronic gout decidedly shortens life. The most serious signs are those indicating advanced renal disease, with non-elimination of uric acid. Gout materially diminishes the chances of recovery from acute diseases and injuries.

TREATMENT.—1. *During the paroxysm.*—It is well to give a brisk purgative at the commencement of a fit of gout, such as a calomel and colocynth pill, followed by a black draught. *Colchicum* is the specific remedy for this affection, but it must be given with due care. From 10 to 20 minims of vin: colchici should be administered every six or eight hours, and it may be combined with the bicarbonate or some vegetable salt of potash freely diluted, or with carbonate of lithia.

A free action of the skin should be kept up by the use of diaphoretic drinks, or the vapour or hot-air bath might be employed in some cases. A low diet is generally indicated at first, which should be gradually improved, but it may be necessary for weak patients to have a good deal of liquid nourishment. As a rule all stimulants ought to be stopped, especially when the patient is young, but sometimes it is advisable to allow a certain quantity of brandy, well diluted. If there is much pain and restlessness, opium must be given at night, in the form of Dover's powder, or subcutaneous injection of morphia may be had recourse to.

As regards *local treatment,* rest is of course essential, and an elevated position should be adopted for the affected parts. These should be wrapped up in flannel or in cotton-wool covered with oil-silk. If the local symptoms are very severe, warm fomentations or poultices containing opium, or localised steaming may be tried; or it may be advisable to apply anodynes, such as belladonna liniment, tincture of aconite, or a solution of atropine or morphia. Removal of blood is extremely rarely called for, but sometimes a blister is useful. As the inflammation subsides gentle pressure by means of a bandage or elastic stocking is often serviceable, in order to get rid of the œdema and other conditions which are liable to remain; gentle friction may also be employed.

Should gout attack internal organs, it is requisite to endeavour to excite inflammation in the joints by means of friction, heat, or sinapisms. In the neurotic affections, opium with stimulants, such as ammonia, ether, camphor, musk, are the remedies indicated, as well as alcoholic stimulants. External heat or sinapisms are also of much value in these conditions. Inflammatory complications may require the application of a few leeches or of a blister, but in most cases gouty patients will not bear much depression.

2. *During the intervals.*—There is no disease for the management of which a careful study of the patient and everything connected with him is more necessary, than in the case of gout. In the early stage a practical cure may often be effected, especially in acquired cases, in so far that no further attacks come on, provided due attention is paid to certain rules. When the complaint is hereditary

also, it may be prevented from exhibiting itself, or at all events may be put off until a later period in life, by the exercise of proper care.

Diet requires strict regulation, and must necessarily vary much in different subjects. It should be nutritious and easily digestible, consisting of a due proportion of animal and vegetable matters, but nitrogenised and saccharine substances must be limited. Moderation in eating and regularity of meals are important. Tea and coffee may be allowed; also soft and stewed fruits, provided they do not contain much sugar; pastry ought to be avoided.

The use of alcoholic stimulants is a matter calling for much consideration. In young persons total abstinence is to be decidedly recommended, as well as in other cases where there is no obvious necessity for stimulants. The nature and quantity of the stimulant to be taken should be always distinctly stated. Malt liquors and all strong wines ought to be rigidly denied. Lighter wines of good quality, such as claret, hock, moselle, or chablis, may be allowed in moderation. Small quantities of spirits freely diluted are also permissible in some cases, either brandy, whisky, or gin, and they may be taken with effervescent mineral waters. When a change is being made as regards the diet and drink of a gouty patient, it should be carried out gradually and not too abruptly.

With respect to general hygienic management, the following are the chief matters needing attention:—daily exercise in the open air and the avoidance of sedentary habits; proper ventilation; daily bathing followed by friction, and the occasional use of a warm, Turkish, or tepid salt-water bath; the wearing of warm clothing, with flannel next the skin; abstinence from undue mental labour; the avoidance of late hours at night, of heated and ill-ventilated rooms, and of lying in bed late in the morning; if possible, residence in a warm and equable climate, but if this is not practicable, protection against all sudden alterations of temperature and exposure to wet, with a change to a favourable climate during the winter months.

The digestive organs must be looked to. The bowels should be daily acted upon, a mild aperient being given if necessary. Much mercury is injurious, but there is no harm in giving a little blue-pill occasionally. It may be requisite to administer remedies with the view of improving digestion and relieving portal congestion.

Mineral waters are often useful, but must be regulated in their administration. Those of Buxton and Bath in this country, and various German waters are considered most beneficial, especially those of Vichy, Wiesbaden, Baden-Baden, Aix-la-Chapelle, Carlsbad, Kissingen, Marienbad, Homburg, Ems, and Wildbad.

It is scarcely necessary to add that everything should be avoided which is known to be likely to bring on an acute attack of gout.

Therapeutic treatment. Colchicum is a valuable medicine even between the attacks of gout, when carefully administered; it is best given in the form of extract at night, with extract of henbane or gentian; or a few minims of the wine may be added to other medicines. In a good proportion of cases tonics are indicated. Quinine, tincture or infusion of cinchona, some form of iron, or mineral acids and bitter infusions are frequently serviceable. Guaiacum and ammoniacum are strongly recommended for asthenic gout in old persons. Iodide of potassium is sometimes beneficial. Alkaline and earthy salts are valuable in many cases, given freely diluted and on an empty stomach, especially the carbonates and phosphates of potash, magnesia, or lithia. The salts of lithia have been specially advocated, either the carbonate (gr. v-x), or the citrate (gr. viii-xii). Most of the mineral waters owe their efficacy to some of these salts being dissolved in them. Carbonate of alumina, benzoate of ammonia, phosphate of soda and ammonia, lime-juice, and various other medicines have also been recommended.

When the joints become much altered but little can be done locally. Friction, shampooing, and pressure by means of strapping might be carefully employed. Sores require the application of some simple dressing. A dressing of solution of a potash or lithia salt has been favourably spoken of.

Chapter XXX.

SCORBUTUS—SCURVY.

Etiology.—Scurvy is a distinct and peculiar disease, though the term is not uncommonly ignorantly applied to a variety of skin diseases. It is met with chiefly among seafaring men, being consequently by far most commonly observed in the hospitals of seaport towns. During the early part of my connection with the Liverpool Northern Hospital a large number of cases were admitted within the year, but subsequently they became less numerous, owing to better regulations being carried out for the prevention of the disease.

Scurvy has been attributed to many causes, such as the use of salt meat or of putrid meat and bad water, or to imperfect hygienic conditions, but my own experience would lead me to agree with those who believe that it is always due to the want of fresh vegetable diet or of some appropriate substitute. This was invariably the case in connection with the seamen in whom I have observed the disease, and in four cases of land scurvy which have come under my notice, the complaint could be distinctly traced to the same cause. It seems, however, to have broken out under circumstances which indicate that it might possibly arise in other ways. During the siege of Paris numerous cases occurred, which were attributed to insufficient food and bad hygienic conditions.

In what way deficiency of vegetables acts is not known, and all that can be stated with certainty is that it leads to some alteration in the composition of the blood. This has been attributed to a want of potash salts, vegetable albumen, vegetable acids, and various other constituents.

Advanced age, a cold and damp climate or season, exposure, fatigue, and despondency have been set down as *predisposing causes* of scurvy.

ANATOMICAL CHARACTERS.—In fatal cases there is usually much emaciation, with œdema of the legs. The blood is very dark and liquid, and its colouring matter stains the tissues. Extravasations are met with in the subcutaneous tissue, as well as between or sometimes even within the muscles, and they are often firmly coagulated or partially organized. Serous and synovial effusions are common, especially pericardial effusion, these being frequently mixed with blood. The organs are loaded with blood, and present ecchymoses and extravasations, being also relaxed and softened. Ecchymoses may be seen under the serous membranes, and the mucous membranes are red and swollen in some parts. Fatty degeneration of the muscles is said to occur. The characteristic appearances associated with scurvy during life continue after death.

SYMPTOMS.—Scurvy sets in gradually and insidiously, and cases are met with in all grades of severity, but in a well-marked case the symptoms are very striking. The patient presents a peculiar unhealthy aspect, the face being sallow and of a dirty-yellowish hue, combined with puffiness about the eyelids, and anæmia, which is well seen in the mucous membranes. There is more or less emaciation, but it may not be very marked even in bad cases. The subjective sensations are those of languor, debility, fatigue, shortness of breath, faintness, pains and soreness in the limbs, mental depression and despondency. These symptoms vary in degree, sometimes amounting to complete prostration, with a tendency to sudden syncope, which may prove fatal.

The mouth affords some characteristic signs. The gums are either more or less swollen, turgid, dark, and spongy, sometimes reaching to or even much beyond the level of the teeth; or they become ulcerated and gangrenous, dropping off in masses, and exposing the teeth or jaws. From the first they readily bleed, and after a time blood oozes constantly from them. The teeth are very tender, so that chewing becomes impossible, and they are also soon loosened or even drop out. Necrosis of the jaws occasionally occurs. The breath has a peculiar and excessively foul odour.

The legs present small purple spots, corresponding to and being dependent upon extravasations of blood into the hair-follicles. They are chiefly observed below the knees, but are not uncommon though less abundant on the thighs, being rarely seen on the abdomen or arms. In addition to these there are more or less extensive irregular ecchymotic patches, presenting various hues according to the changes which the colouring matter of the extravasated blood has undergone. Brawny indurations can be felt, due to deeper extravasations, especially in the hams and calves, and these are often very painful and tender. Œdema of the feet and legs, and desquamation of the cuticle are common symptoms. There is much stiffness and pain in movement, and a constant feeling of aching and contusion in the legs is experienced.

In some cases hæmorrhages take place from various mucous surfaces. Ulcers are occasionally formed, or old ulcers may break out anew or assume an unhealthy aspect, being covered with large bleeding granulations. It is said that old fractures sometimes become disunited, bones soften, or epiphyses become separated.

The alimentary canal is usually out of order. The appetite is impaired as a rule, but sometimes patients feel inclined for food but cannot chew, and certainly as soon as they are able to masticate the appetite generally returns. In severe cases there may be nausea and vomiting. Obstinate constipation is the rule, but occasionally the bowels are relaxed, and the stools may contain blood, or actual dysentery may be present as a complication. There is no pyrexia usually. The pulse is infrequent, weak, and small. The patient often passes restless nights. The urine is deficient in quantity, dark-coloured in some cases, and tends to decompose rapidly. Urea, phosphates, and potash are deficient. Occasionally blood is mixed with the urine.

Morbid conditions of the blood have been described, but there is no certainty on this matter. Garrod states that potash is much diminished in quantity. Dr. Leven affirmed that in cases in which he examined the blood during the siege of Paris, he found fibrin in excess, and corpuscles diminished by one half.

Diagnosis.—The only disease likely to be confounded with scurvy is purpura; the diagnosis will be pointed out after the latter has been considered.

Prognosis.—All the cases of sea-scurvy which came under my notice rapidly recovered, with one exception, and in that case death resulted from an accidental complication, viz., apoplexy. Therefore the prognosis is highly favourable, if proper treatment can be adopted. In my experience sporadic cases of land-scurvy do not seem to be so easily cured, and in one instance acute gastro-enteritis and pneumonia set in without any evident cause, ending in speedy death; while in another recently under my care no treatment seemed to produce any result, and the patient sank from the direct effects of the disease, there being high pyrexia.

Treatment.—Sea-scurvy is one of the most satisfactory diseases to treat, speedy recovery being brought about in the great majority of cases, provided the necessary remedies can be obtained, viz.; plenty of fresh, soft, and succulent vegetables; with from ℥ iv to ℥ viij of lime—or lemon-juice daily. Potatoes and cabbages constitute the best vegetables. Oranges, lemons, citrons, and other fruits of this class are also very valuable. Water-cress, garden-cress, mustard, scurvy-grass, sauer-kraut, spruce, fir, and various other vegetable growths have obtained repute in the treatment of scurvy, and might be tried if the more reliable remedies cannot be procured. It is stated that vegetables act best when uncooked, but ordinarily it is unnecessary to give them in this condition.

Liquid nutritious food is needed, such as beef-tea and milk, often in considerable quantity, and as soon as the patient can chew, meat should be allowed. Stimulants are frequently indicated, but should be given carefully and in small quantities. In a few days it is advisable to administer some tonic, such as quinine and iron, which aids recovery by exciting appetite, strengthening the patient, and improving the quality of the blood.

The mouth must at first be frequently washed out with some dilute antiseptic, of which one of the best is Condy's fluid. At a later period a mild astringent, such as alum water, may be used. Constipation is generally a troublesome symptom, and is best treated by enemata. Fomentations may be applied to the painful swellings in the legs. If serious hæmorrhage occurs, astringents must be given. Ulcers may be dressed with lime juice, but they improve rapidly under its internal administration.

Many remedies have been recommended in the treatment of scurvy, such as salts of potash, solution of various vegetable acids, especially citric, and phosphoric acid. In my experience they are not reliable. Raw meat and seal's flesh have also been employed, it is said, successfully.

The prevention of scurvy is a most important matter in connection with those persons who lead a seafaring life. There can be no question but that the disease may be completely prevented by the use either of fresh vegetables, preserved vegetables, or of proper lime or lemon-juice, which should be served out daily. Many of the specimens of so-called lime-juice used on board ship are worthless; often only a solution of citric acid is used, which decidedly does not prevent the disease. The free employment of vinegar and the vegetable salts of potash has been recommended. It is important to attend to all hygienic and other measures for maintaining the general health of the men, and to avoid undue exposure.

Chapter XXXI.

PURPURA.

Etiology.—Purpura is due to a peculiar unhealthy condition of the blood and tissues, which may probably be originated in many ways, but its causes are not at all clearly defined. The disease is quite distinct from scurvy. It may depend upon unhealthy hygienic conditions; deficiency of proper food (? vegetables); intemperance and other lowering agencies; or it may arise in connection with various acute fevers, or in the course of many chronic affections, such as albuminoid disease, syphilis, cancer, Bright's disease, or cirrhosis of the liver, while it often accompanies jaundice. Sometimes it follows the administration of iodide of potassium. Purpura may affect persons apparently perfectly well, even in its worst forms. Amenorrhœa has been stated as a cause. The old and young are most liable to be affected.

Anatomical Characters.—Purpura is characterized by rupture of the capillaries and escape of the blood in various parts, indicated by petechiæ and ecchymoses on the skin; hæmorrhages from mucous, and sometimes from serous surfaces; and extravasations into the cellular tissue or muscles, or into certain organs, such as the brain, lungs, and pelvis of the kidneys. Organs are often found diseased, this being the cause of the purpuric condition. The blood may be quite normal, or dark and fluid. The cutaneous capillaries are usually healthy, but there is reason to believe that they have sometimes undergone structural degenerative changes.

SYMPTOMS.—Purpura is described under two chief forms, *purpura simplex* and *purpura hæmorrhagica;* in the former the hæmorrhages are only observed in connection with the skin; in the latter they take place also from mucous surfaces, and sometimes into serous cavities or into the substance of organs, while the cutaneous hæmorrhages are generally more abundant. The skin presents various forms of extravasation, viz., minute points (stigmata), petechiæ, vibices, and extensive ecchymoses. These are observed chiefly on the legs, and may appear in successive crops, each lasting a variable number of days. Their appearance is often favoured by much standing. From the first pressure produces no effect on the colour, which is often bright-red at the outset, but afterwards becomes darker, being purple, violet, or almost black in some cases. The usual changes of colour are seen as the extravasations disappear. The spots are generally roundish, and have a well-defined outline at the commencement, but subsequently they gradually fade into the surrounding skin. They are not at all raised, but there is often hardening and swelling of the subcutaneous tissue. Blebs containing sanguineous serum sometimes form under the cuticle, and in rare instances the skin becomes gangrenous.

The hæmorrhages from mucous surfaces which may be met with are epistaxis, hæmorrhage from the gums and mouth, hæmatemesis, melæna, hæmaturia, hæmoptysis, and menorrhagia. Rarely bleeding from the ear takes place. Extravasations may also escape into the mucous membranes, such as the conjunctiva, or that covering the palate, cheeks, or gums. Little blisters containing bloody serum sometimes form on the tongue or cheeks. Extravasation into organs is rare, but death has occurred from pulmonary or cerebral apoplexy.

The general symptoms vary much, and are considerably modified by the conditions under which the purpura arises. There are often premonitory symptoms for some time, such as general pains, languor, and debility, but not always. The attack may be ushered in by pyrexia and occasionally paroxysms of a hectic type have been noticed. Pains in the abdomen, epigastrium, loins, chest, and limbs are often complained of. The digestive organs may or may not be impaired. There is always more or less debility and sense of depression, and in severe cases this becomes extreme, being accompanied with marked anæmia if much blood has been lost, and a tendency to faintness or syncope. The pulse is usually feeble, quick, and compressible. The urine may be albuminous, independently of the presence of blood, and sometimes contains casts.

Purpura has a very variable duration, being either *acute* or *chronic* in its progress. It usually terminates in recovery if uncomplicated.

VARIETIES.—In addition to those already mentioned, the following are described:—1. *Senilis,* which is met with in old people, owing to degeneration of their vessels, and especially on the exposed and irritated arms of old women. 2. *Rheumatica,* occurring in rheumatic individuals and attended with much pain. 3. *Urticans,* where *purpura simplex* accompanies urticaria. 4. *Papulosa,* which is merely a form of lichen. Petechiæ may be observed in connection with many skin diseases.

DIAGNOSIS.—Scurvy is the main disease from which purpura has to be distinguished. It might possibly be mistaken for ecchymosis from injury, flea-bites, typhus fever, or the hæmorrhagic form of measles. It must also not be confounded with the *hæmorrhagic diathesis.*

In addition to the difference in the etiology of the two diseases, purpura not being due to the want of vegetable food, and the use of this class of diet or of lime-juice not having any material influence in its cure or prevention, scurvy has the following characters to separate it from purpura:—1. The peculiar colour and sallowness, of the skin. 2. The state of the gums. 3. The greater extent of the ecchymotic patches. 4. The presence of brawny indurations in the substance of the limbs, accompanied with much pain and stiffness. 5. Extensive desquamation of the cuticle.

PROGNOSIS.—The prognosis of purpura will depend greatly on its cause, and especially whether it is associated with any organic affection. The *hæmorrhagic* variety is very dangerous, but I have known recovery take place, apparently spontaneously, when all treatment had failed, and the case had been given up as hopeless. The simple form is often very tedious, and liable to return.

TREATMENT.—In the first place it is necessary to enquire into all hygienic conditions, and improve them if they have been at fault; at the same time giving a nutritious diet, consisting of both animal and vegetable constituents, stimulants being also often required.

Rest in the recumbent posture is generally advisable, or at any rate the legs should be kept up. Attention must be paid to any cachexia present, or to any organic disease on which the purpura may depend. If there is much plethora, saline purgatives may be given at the outset.

The chief remedies employed for the cure of purpura are tincture of iron in full doses, turpentine, tincture of larch bark, and arsenic. The first is most useful, and it may be combined with quinine and dilute sulphuric acid. In the hæmorrhagic form, gallic or tannic acid, alum, ergot of rye, acetate of lead, or subcutaneous injection of ergotine might prove serviceable. Other astringents should be freely administered, but they often fail. Local astringents, pressure, and cold, especially by means of ice, may be tried where this is practicable. Careful bandaging of the legs, or the use of an elastic stocking, is advantageous in many chronic simple cases.

CHAPTER XXXII.

RACHITIS—RICKETS.

TIOLOGY.—Rickets is a very prevalent disease in this country, nd the out-patient practice of any hospital presents a large pro-ortion of cases. It is unquestionably a *general* or *constitutional* isorder, and can in the large majority of instances be traced to ome obvious cause or causes, leading to imperfect nutrition.

This complaint always sets in during infancy or childhood, specially during the first or second year. It is not a congenital isease, and rarely appears before six or seven months after birth; t may commence as late as seven or even nine years of age. ome believe that it is hereditary, but in most instances this is ertainly not the case. Early marriages, intermarriage, and ill-ealth or advanced age of the father, have been set down as causes, ut there is no evidence of this, nor is rickets a mode of develop-ent of tubercle or syphilis. A large proportion of cases of ickets occur in children who have been brought up by hand hroughout or from an early period, and have been improperly fed rtificially. Prolonged suckling is sometimes the cause, the milk ecoming unfit for proper nourishment; or too frequent suckling. The state of health and general nutrition of the mother has also a aterial influence in the causation of this disease, through the ilk, and hence all imperfect hygienic conditions, deficiency of food, hronic diseases, and other agencies which impoverish the blood nd undermine the health of the mother, tend to produce rickets in he child, unfavourable sanitary conditions also tending directly to nduce rickets, especially want of fresh air and sun-light. In some nstances it appears to depend upon some previous debilitating isease, particularly gastric and enteric catarrh with long-con-tinued diarrhœa.

Occasionally a child becomes rickety in the midst of a family, but if one is affected those who follow generally suffer also. Among the poorer classes it is very common for all the children after the second or third to be the subjects of this disease. It is far less frequent in country places and small towns than in large towns and cities.

ANATOMICAL CHARACTERS AND PATHOLOGY.—The bones present the chief morbid changes associated with rickets. These consist in an increased growth or proliferation of the epiphyses and periosteum, accompanied with delayed, imperfect, and irregular ossification. As a result the ends of the long bones are greatly enlarged; the flat bones are thickened, especially at their growing edges; all the bones are softened, and hence curvatures and angular deformities arise, leading to more or less distortion.

The degree of enlargement of the epiphyses varies considerably, and there is much difference in the relative amount of this and of softening of the bones. They are increased chiefly in breadth, not because the growth is lateral, but on account of the pressure and muscular action to which they are subjected. The layer of cartilage in which ossification normally proceeds is much developed, and the cancellous tissue of the bone is increased. The material is very soft, and a quantity of red pulp can be expressed, consisting of fat, nucleated cells, and blood-corpuscles.

The shafts of the long bones may be so softened that they can be easily bent or cut with a knife or scissors; the periosteum is vascular and thickened, owing to the formation of a tissue from which bone is normally produced, and this is especially noticed at the line of junction between the bone and cartilage. Pathologists hold very different views as to the original cause of this softening of the shafts. Some believe that there is at first an absorption of the calcareous matter already deposited, as well as impeded ossification; probably, however, there is no such absorption, but the old bone disappears from within in the ordinary course of things, as in health, while the newly-formed external material which takes its place does not undergo proper ossification. Much red pulp is contained within the medullary canal and the various interstices of the bone.

Some important deviations are observed as regards the mode of deposit of the calcareous matter during the progress of ossification. Instead of there being a tolerably regular line where calcification is proceeding at the junction of the bone and cartilage, as is normally observed, this line is very unequal, the calcareous matter in some parts shooting far up into the cartilage, portions of which may also become completely isolated, and in advanced cases there are often distinct spots of calcification. Some of the cartilage cells are very large, and Kölliker and others describe them as being directly converted into lacunæ by a deposit in their walls, canaliculi forming at the same time. Sir W. Jenner states that the calcareous matter is deposited within the cells, which may become completely filled, the process in fact being merely one of petrifaction.

Another abnormal condition of importance is, that the medullary cavity passes into or beyond the line of ossification, while distinct spaces form in the epiphyses, which may contain a fibrous vascular stroma, resulting from fibrillation of the interstitial tissues, around which calcification takes place.

The flat bones are similarly altered, being thickened from periosteal formation, especially near their growing edges, as well as softened, consisting chiefly of diploë containing much red pulp.

The chemical composition of rickety bones becomes greatly altered; the organic matter is markedly in excess, being in the proportion of 79 to 21 inorganic, and neither gelatin nor chondrin can be obtained.

Certain obvious changes arise as the result of the altered structure of the bones. The spinal column and long bones are bent and twisted, producing often much deformity. The chest and pelvis are peculiarly distorted. Where a long bone is bent, its medullary cavity is narrowed, and may be ultimately completely closed by callus. Partial or complete fractures are not uncommon, but the periosteum remains uninjured.

The skull is large, its sutures remain long ununited and its fon-.nelles open, while the bones forming it are especially thickened t a little distance from their edges, so that the sutures appear rooved, with a little elevation on either side. In some parts the ones may be thinned or even perforated, so that the periosteum nd dura mater meet.

Should the rickety process subside, the enlargement of the epi-hyses diminishes, and they often ossify rapidly, growth of the ones in length being thus interfered with, leading to the produc-on of dwarfs. The shafts also become firm, remaining perma-ently more or less deformed. The head continues to grow, and ften becomes very large.

The pathology of the morbid conditions observed in rickety ones is by no means agreed upon. Some believe that the roliferation of the epiphyses and periosteum is primarily due) inflammation, and that the resulting disturbance of circulation revents the deposition of calcareous salts. Others think that the alcareous matters are not supplied in sufficient quantity; and till others that they are absorbed, or are prevented from being eposited owing to the presence of excess of lactic or some other cid in the blood, which keeps them dissolved, and they are then xcreted by the kidneys. Sir W. Jenner is of opinion that there is o deficiency of lime salts, but a malposition.

The tissues in rickety children are relaxed and wanting in tone, nd all structures in connection with bones are arrested in their rowth. The muscles become small, pale, and flabby.

Important internal morbid conditions are frequently met with, hich can only be enumerated at present. These are :—1. Col-apse and emphysema in various parts of the lungs, in connection ith the deformed and weak thorax. 2. Bronchial catarrh, exten-ive bronchitis, or pleurisy. 3. White patches on the pericardium nd spleen, due to the distorted chest. 4. Albuminoid infiltration f most of the organs, involving sometimes all the absorbent lands, but especially the mesenteric glands. 5. Chronic hydro-ephalus, either meningeal or ventricular. 6. Enlargement of the rain, due either to albuminoid infiltration or increase of the eurogila, and not to true hypertrophy. 7. Gastro-enteric ca-arrh.

Symptoms.—At an early period the symptoms of rickets are often ot very definite, and the onset of the disease is insidious. Gener-lly there is marked disturbance of the alimentary canal, with ome pyrexia, the pulse being quick and irritable. The child lters in disposition, becoming dull and sad, or peevish and irri-able; and is languid, refusing to play or be amused. It may cease o walk if it has already commenced, or will not shew any signs of naking the attempt. At the same time there is wasting, the issues becoming flabby, and the face pale. These and other on-characteristic symptoms may be present, but there are three igns which Sir W. Jenner looks upon as pathognomonic. These re—1. Profuse sweating about the head, neck, and chest, especi-lly during sleep, attended with enlargement of the veins, the other parts of the body being often at the same time hot and dry. 2. General soreness and tenderness of the body, so that the child cries on being touched, or even on the approach of anyone; cannot bear to be washed; and keeps quite still, avoiding every movement. Older children do not suffer so much, but complain of pains in the limbs. 3. Throwing off of the bed-clothes at night, in order to try to get cool. At this time also the urine may be very copious, and may contain abundant calcareous salts or phosphates.

Sooner or later the changes in the bones are revealed, and in out-patient practice it is generally found that these are more or less obvious when the child is brought to the hospital. The enlarged ends of the bones are distinctly seen or felt, so that the joints appear swollen and knobby, especially those which are least covered, such as the wrists and ankles, having also a loose feeling. A string of nodules is felt along each side of the chest at the junction of the ribs with their cartilages. The limbs are variously distorted and curved, as well as the clavicles, which exhibit two bends; the spine is curved and deformed, and in many cases also the pelvis and chest. The chest-deformity will be considered later on, but it is impossible to give a description here of the various other distortions met with, which differ according to the movements carried on, the mode in which the child is supported and carried, and the ordinary position assumed, and they will vary with the age at which the disease sets in; they result from pressure and gravitation, and not from muscular action. In some cases the enlargement of the joints is most evident; in others the distortion of the limbs.

The head and face present well-marked characters. The former is large, and has a long antero-posterior diameter, with a high, square and often projecting forehead; the anterior fontanelle remains unclosed much beyond the ordinary period; and in many cases the sutures are open and grooved, with a thickening on each side. In some parts, and especially over the occiput, the bone may be very thin or entirely absent, but this last condition is very rare. The hair on the scalp is generally thin. The face looks small but broad, and is often turned up, owing to the head being thrown back or sinking between the shoulders. It assumes a staid, sedate, or pensive expression, and becomes "old-looking." The teeth appear very late, in many cases none having come through at the end of a year or more, while they also rapidly decay or fall out, being deficient in enamel.

The general symptoms progress in the course of the disease; emaciation, flabbiness of tissues, debility, and loss of power are more or less marked, the child being sometimes completely helpless and unable to sit up or move in the least, the head dropping in any direction. The skin often becomes thick and opaque, and covered with downy hairs, while sweating continues. The alimentary canal is more or less deranged. Hectic symptoms may set in. All development and growth is arrested, the body remaining short and stunted.

Much difference of opinion exists as to the state of the intellect in rickety children. Many believe that the mental powers are above par, but this is certainly not the case, although they may appear to be very precocious, and are often amusing; in some instances they become stupid and almost imbecile, this being evident in the expression of the face. Rickety children are late in talking.

The urine is pale and abundant, contains an excess of earthy phosphates and lactates, and sediments of oxalate of lime often form. Urea and uric acid are said to be deficient. Calculi are not uncommon.

During the course of rickets symptoms indicative of the complications already mentioned frequently appear. Among the most common and dangerous are bronchitis and gastro-enteric catarrh. Laryngismus stridulus and convulsions are also very liable to occur. If death happens, it is generally due to one of these complications, but may be the result of the cachexia attending the disease itself.

Cases of rickets present all grades of severity and advancement. When a favourable termination ensues, the symptoms gradually subside, strength is restored, the bones ossify, but usually more or less permanent distortion remains, which, however, may frequently be greatly diminished by appropriate treatment. Children who have suffered from severe rickets rarely attain the ordinary height.

PROGNOSIS.—Most cases of rickets may be cured, if taken at a sufficiently early period and treated properly. Its complications are very serious, and the presence of rickets adds much to their gravity, especially in the case of chest-affections. The thoracic and pelvic deformities which it produces are very injurious.

TREATMENT.—The first matter to attend to is the dieting of the child, which is almost always at fault, and about which thorough enquiry should be made, with the view of correcting anything that may be wrong. The breast should only be taken at regular stated intervals and for a certain time; or the child should be weaned if suckling has been too long-continued, or may be partially artificially fed. Often the mother's health requires attention. The feeding of children artificially needs the greatest care in this disease. Milk with a fourth part of lime-water constitutes the most important article of diet, to which may be added a little cream and milk-sugar. These must be given in regulated quantities, and the feeding-bottle should be kept scrupulously clean. It is a common custom to give young infants considerable quantities of arrowroot, corn-flour, and various artificial foods of a farinaceous character, and these certainly do much harm. Only a very small quantity should be allowed. Ass's and goat's milk are useful if they can be obtained. For older children, beef-tea in small quantities and milk-puddings are valuable, and later on they may have pounded meat, or be allowed to suck a large piece of underdone beef, or be given the juice pressed out of this. Potatoes well mashed with gravy may also be permitted in moderation. All indigestible substances must be avoided.

Hygienic management requires much attention. The ventilation of the bedroom must be looked to, and the child should have a separate bed, if possible, kept very clean and dry. After the early symptoms have subsided, the patient should be much out of doors whenever weather permits, in the sun, a dry bracing air of moderate temperature answering best. The clothing must be sufficiently warm, and the common custom of exposing the lower part of the body ought to be avoided. A change to the seaside is very beneficial. The body should be washed over twice a day with warm water; and later on warm salt-water bathing followed by friction is useful. It is important to look to the position assumed by the child, and to the movements carried on, so as to prevent deformity. Straight wooden splints lightly applied along the legs and extending a little beyond the feet, are of use for the purpose of preventing the child from attempting to walk. The abdomen should be well supported by a bandage. Any distortion of the limbs must be removed, as far as possible, by systematic efforts to straighten them.

Therapeutic treatment.—It is almost always necessary to treat the alimentary canal, as this is usually out of order. Rhubarb with carbonate of soda, magnesia, or chalk answers very well, and an occasional dose of castor-oil may be given. Grey powder is useful now and then, when the stools are offensive, but should not be administered as an habitual thing. Lime-water also improves the state of the stomach and bowels. Alkalies and bitters are recommended by some practitioners. At a later stage the two great remedies are cod-liver oil and some preparation of iron, care being taken that the limbs are straight before these are administered. The former should be given after meals in small doses. It may also be rubbed into the arm-pits, and a flannel moistened with some of it may be worn over the abdomen. The best preparation of iron is steel wine, but others are useful, especially the tartrate, ammonio-citrate, syrup of the phosphate or iodide, or Parrish's food. Chalybeate waters are also of service. Sometimes it is advisable to combine quinine with the iron.

When any inflammation arises in rickety children, lowering measures are not borne, but supporting treatment is indicated. Laryngismus requires tonics and baths. The slightest sign of bronchial catarrh ought to receive immediate attention, as rickets renders this complaint extremely dangerous, while it aids materially in producing deformity of the chest.

CHAPTER XXIII.

CONSTITUTIONAL SYPHILIS.

In the present chapter it is not intended to give a full description of syphilis, but merely to sketch an outline of the course of the affection as it results from *direct inoculation*, with the constitutional effects thus induced; and to consider the phenomena presented by *congenital syphilis*.

Syphilis from direct inoculation.—Syphilis is classed by many along with the specific fevers, the differences observed being supposed to be due to its more prolonged course. As a primary disease it can only be transmitted from one individual to another by *direct inoculation* or *contact*. This produces a *specific sore*, having an indurated base, with but little tendency to suppuration, the neighbouring lymphatic glands being also hard and somewhat enlarged. Then follows a *period of incubation*, of from one to three months duration, at the close of which *secondary symptoms* arise. These are preceded and accompanied by some general disturbance, indicated by languor, pains in the bones and joints, .especially at night, debility and loss of flesh, slight pyrexia, impaired digestion, and tendency to anæmia. The secondary symptoms consist of—1. A cutaneous eruption, of very variable character, being either a mere rash, papular, scaly, vesicular, pustular, bullous, or tubercular. It usually presents a coppery tint, and is most marked in the bends of the limbs. 2. Ulceration of both tonsils, the ulcers being grey, abruptly cut, scarcely painful, and without any tendency to spread. 3. Enlargement of the glands of the neck, especially behind. 4. Superficial inflammation of the mucous membrane of the mouth, tongue, palate, pharynx, or larynx, sometimes with slight ulceration. 5. Mucous tubercles or condylomata in connection with the tongue, angles of the mouth, pharynx, larynx, anus, penis, labia, and other parts. 6. Loss of the hair, which becomes dry and thin. 7. Onychia. 8. Iritis or retinitis, these been rather late phenomena. 9. Slight and transient periostitis, especially on the cranium. More or less of these morbid conditions may be present, and this stage lasts from six to twelve months usually, but may in rare instances extend to eighteen months or longer. Secondary lesions show a remarkable tendency to symmetry.

After this succeeds a period differing greatly in duration in different cases, during which there are either no symptoms at all, or only occasional slight cutaneous eruptions, or little ulcers on the tongue or lip. This interval is in many cases followed by *tertiary symptoms* or *sequelæ*. The chief pathological tendencies of tertiary syphilis are to produce certain lowly-organised growths of the nature of fibro-plastic, fibro-nuclear, or fibroid tissue, which are prone to suppuration and ulceration.

Many growths are met with in tertiary syphilis which are merely proliferations of ordinary connective or fibrous tissue, and present the same characters, but those which are peculiar to syphilis constitute what are termed *gummy tumours* or *gummata*; there is, however, no marked line of demarcation between these, both often existing together, and the former becoming converted into the latter. Gummata are not of the nature of an exudation, but result from hyperplasia of the connective-tissue elements previously existing, beginning in the walls of the vessels, the new elements invading the normal tissues and being mixed up with or displacing them. At first they are soft, translucent, greyish-white, almost homogeneous; but afterwards they become firmer, tough, yellowish, *opaque, non-vascular*, and caseous-looking, owing to degeneration and gradual drying up. On section they often present a central yellowish mass or several spots surrounded by a translucent fibrous layer, which sometimes look like a capsule, but this cannot be separated from the surrounding tissues, into which it gradually passes. Gummata vary much in size, and some of the larger masses seem to be formed by the union of smaller nodules. In structure they resemble at first granulation-tissue or embryonic connective-tissue, consisting of an amorphous matrix, with minute spherical or ovoid finely-granular cells enclosing obscure nuclei. This matrix becomes fibrillated more or less, while many of the young elements degenerate and ultimately break down into mere granules of fat and cholesterine, which are imbedded in a small amount of fibrillated stroma. These several stages may be seen in the same growth, the central yellowish portion of the nodule being that which is most advanced. A few vessels are present in the recently-formed tissue, but these afterwards disappear.

These growths may be absorbed more or less completely, or their fibrous stroma may be left, which tends to shrink, giving rise to deep cicatrices or seams; in certain structures they are liable to suppurate or ulcerate. Several tissues and organs are often affected at the same time, this being one of the great characteristics of syphilitic deposits.

The chief morbid conditions which are liable to be met with in *tertiary syphilis* may be enumerated as follows:—1. Skin-eruptions and ulcerations, viz., erythema and psoriasis of the hands and feet; ulceration from tubercles, subcutaneous gummata, or syphilitic lupus. These ulcers are horse-shoe or kidney-shaped, and spread in a serpiginous manner. 2. Ulceration of the pharynx and palate. The ulcer may commence at any point, often starting in two or more places. It is unsymmetrical, spreads very irregularly and deeply, causing much destruction of tissue, and forming an excavation with hard borders. It often extends to the larynx, thus inducing very dangerous symptoms; or may even reach the œsophagus. When cicatrization takes place, there is often much induration and contraction, which may lead to obstruction. 3. Induration of the tongue, followed by hard, well-defined, unhealthy, painful ulcers. 4. Ulceration of the rectum occasionally, accompanied with dysenteric symptoms, and very apt to be followed by stricture. 5. Growths in or ulceration of the larynx, the latter almost always beginning on the epiglottis and presenting the usual characters. The cicatrix following a syphilitic ulcer here is firm, pink, shining, retracted, and surrounded with growths, hence causing serious interference with breathing. The cartilages often necrose. 6. Fibroid thickening of the trachea and larger bronchi, leading to diminution of their calibre. 7. Gummata in the subcutaneous tissue or "cellular nodes," most frequent among females, and generally observed on the legs, being single or multiple. They finally form ulcers. 8. Inflammation of a bursa, especially that over the patella, followed by ulceration. 9. Gummata in the voluntary muscles, often forming indurated tumours. 10. Periostitis and disease of the bones. Periosteal nodes form chiefly over the tibia and skull, sometimes in large numbers, but they may be observed over almost any bone. They are usually attended with severe pain, especially at night, and feel very sore and tender. They may undergo absorption, ossification, fibrous development, suppuration, or may become truly gummatous. Bones are often carious or necrosed, portions being exfoliated and leading to much destruction of tissues. This is not uncommonly seen about the nose, palate, and skull, and may originate intercranial inflammation. I have met with several instances of syphilitic caries of the ribs leading to pleurisy. Syphilitic caries presents a peculiar worm-eaten appearance. 11. Enlargements of the testicle, due to gummata. 12. Chronic enlargement of the lymphatic glands, with but very slight tendency to suppuration. 13. Gummata or fibrous growths in the internal organs, especially the liver and nervous centres; or not unfrequently albuminoid disease and fatty degeneration. 14. Growths in the placenta, leading to abortion or miscarriage, which may also happen from the direct effects of the syphilitic poison on the ovum.

These different morbid changes are accompanied with more or less constitutional cachexia, and they necessarily give rise to local symptoms according to the part affected. In tertiary syphilis the lesions present no tendency to symmetry.

Congenital or Hereditary syphilis.—Syphilis in the infant is occasionally evident at birth, and various internal lesions may be developed while in utero; but more commonly the disease is not manifested before from three weeks to a month or two after birth, very rarely as late as six months. The appearance of the child is usually highly characteristic. There is great emaciation with anæmia, all fat having disappeared, while the muscles feel flabby, the skin hangs in loose folds, and growth is retarded. The face has a peculiar shrivelled, aged, decrepit look, which is particularly seen when the child cries, being also dark, opaque, earthy or muddy-looking. The nose is often broad or depressed. The entire skin feels dry, harsh, rough, and inelastic, and the cuticle desquamates. Various cutaneous eruptions are liable to break out, which tend to be moist; among the most frequent is a dull red or coppery, shining, erythematous condition of the palms and soles; of the surface around the anus; and of the thighs and genitals. Roseola, lichen, psoriasis, eczema, impetigo, ecthyma, or pemphigus may be observed. Small yellowish patches sometimes form on the skin, like hard scales, which on separating leave superficial ulcers. The hair is often very deficient, and the nails grow slowly, while they are prone to ulceration. The mucous membranes are either inflamed, or the seat of tubercles or condylomata, or ulcerated. The mouth is hot and swollen, and the lips fissured. Among the most characteristic phenomena are a peculiar hoarse cracked cry; and snuffling, with nasal discharge, which tends to clog the nostrils and interfere with breathing. Ulcers may be visible about the nose, angles of the mouth, lips, throat, anus, or labia. Mucous tubercles are frequently observed about the mouth and anus, on the

labia sometimes or scrotum, near the umbilicus, or in the lar
Condylomata are occasionally present. Discharges from the
lids or ears are not uncommon. Occasionally iritis or some c
inflammatory affection of the eye is set up. Syphilitic childrer
more liable to serous inflammations than others. Nodes very r
ly appear, but are apt to be numerous when they do form.
internal organs may be affected. In exceptional cases there
well-marked evidences of congenital syphilis without any par
lar emaciation or anæmia.

Mr. Hutchinson calls attention to some important distinc
between *congenital* and ordinary *constitutional* syphilis. He st
that in the former the secondary and tertiary phenomena sc
times occur together, but the secondary are not then well-marl
as a rule, however, there is a considerable interval between tl
the child apparently recovering more or less completely, tert
symptoms not setting in until between five years of age and
time of puberty or even later. In the meantime the health ma
good, but the appearance is hardly ever satisfactory, while gr
and development are sometimes much retarded. As special se
dary symptoms, he mentions diffuse stomatitis without ulcers,
diffuse inflammation of the mucous membrane of the na
among tertiary symptoms a form of phagedenic lupus, and in
stitial inflammation of the cornea or keratitis. Deafness and an
rosis are also stated to be far more common in the inherited
ease, but paralysis of single nerves is not observed. Ano
point of difference is that in all its stages congenital syphilis t
to exhibit symmetry.

The teeth are sometimes very peculiar in congenital syph
The incisors of the temporary set are cut early, but are of
colour and crumble away speedily, especially the upper cen
The same teeth of the permanent set are of a bad colour; sl
narrow, peggy, and deformed; rounded at the angles; separ
by an interval, or turned towards each other; the edges b
jagged or having a vertical notch, with sometimes a sha
groove running up to the gum in front and behind. The can
may be similarly affected.

It has been suggested that the virulent character which scarla
sometimes assumes in individuals or in families during a mild
demic, may be the result of a syphilitic taint.

There are certain important points bearing upon the trans
sion of syphilis to which it is necessary to allude. It seems cer
that the disease may be communicated to the mother through
fœtus, usually only tertiary symptoms being then produced,
these are not severe. There is reason to believe that it ma
transmitted to a third generation. Probably it may be origin
by the milk of a syphilitic nurse; and some believe that on
other hand a syphilitic child may infect the nurse.

Diagnosis.—It is only intended here to offer a few remark
specting the general diagnosis of constitutional syphilis, wh
resulting from inoculation or hereditary transmission. The p
bility of the existence of a syphilitic taint should always be t

in mind, and in any doubtful case it is requisite to make rigid investigation in order to clear up this point. If direct information cannot be obtained, it may often be procured indirectly by enquiring about the ordinary secondary and tertiary symptoms of syphilis, such as sore throat, rash, &c. Examination of the throat, mouth, tongue, eyes, or over the tibiæ or skull, may give evidence of past or present disease, in the form of cicatrices, iritic adhesions, nodes, and other lesions. The existence of paralysis of a single nerve, especially one of the cranial nerves, is strongly indicative of acquired syphilis. Nocturnal pain is also a suspicious sign. In not a few cases the effects of treatment give evidence of the presence of the disease.

Inherited syphilis may in many instances be recognised at an advanced period by pallor and an unhealthy aspect; arrest of growth or development; a sunken bridge of the nose; the peculiar teeth or the early loss of the temporary set; pits and scars or even actual ulcers on the skin, about the angles of the mouth, or in other parts; keratitis or its remains; double deafness without otorrhœa; amaurosis; periosteal nodes or their remains; a very prominent forehead, resulting from meningitis.

TREATMENT.—For constitutional syphilis the two great remedies are mercury and iodide of potassium, the former being especially valuable during the secondary stage, the latter during the tertiary. Mercury may be introduced into the system by the mouth, by inunction, or by the bath, and it is in many cases requisite to bring the patient rapidly under its influence, of course due care being taken to prevent any injurious effects. Calomel, blue pill, and bichloride or iodide of mercury are the forms in which it is usually administered, and the iodide is often very beneficially combined with iodide of potassium in the later stages. Local applications of mercurial ointment or black-wash are valuable in many cases.

Iodide of potassium should be given at first in doses of 5 grains three times a day, and then gradually increased to 10, 15, 20, or even 30 grains in some instances. When this drug cannot be borne in such large quantities, it has been found that great benefit may be derived from its administration in very small doses. It is often usefully combined with decoction of cinchona and ammonia.

Congenital syphilis decidedly requires mercury. It may be given in the form of hyd. c. cræta, gr. ½ ter die; or the ointment may be rubbed into the arm-pits and the thighs; or the milk may be used to convey it, blue pill being given to the mother or nurse, or the milk of a mercurialized goat being employed. At the same time all hygienic conditions must be carefully attended to, and the child properly fed. Cleanliness is essential, and simple local applications are often necessary, or black-wash may be needed. Toilet powder should be freely used over the seat of eruption. The use of cod-liver oil, either internally or by inunction,is frequently attended with benefit.

In the advanced stage of congenital syphilis mercury often disagrees seriously, and at the early stage it sometimes cannot be given. *Iodide of potassium must then* be substituted.

CHAPTER XXXIV.

TUBERCULOSIS—SCROFULOSIS.

VARIOUS questions connected with tuberculosis and tubercle remain still very unsettled, and many observers are engaged in endeavouring to elucidate them. All that can be aimed at in this work is to give a brief general summary of the present state of knowledge and opinion on the subject, deduced mainly from the results of microscopic research and experiments upon animals.

Many believe in the identity of the scrofulous and tubercular diseases; others consider them as entirely distinct.

ETIOLOGY.—Looking upon tuberculosis as a constitutional disease, it has almost universally been considered hereditary. Undoubtedly various forms of tubercular disease run in families, but many pathologists think that only a constitutional debility is transmitted, with a tendency to low inflammations, the products of which rapidly become caseous and may thus lead to tubercle. This is the view strongly expressed by Niemeyer, and he believed that the same result would follow in the case of children born of parents debilitated from any cause. Occasionally tubercle is congenital. Intermarriages, very early marriages, and advanced age of the father have been set down as causes of inherited tuberculosis Syphilis in the parent has probably considerable influence in its development.

Age materially affects both the development of tubercle and its seat. It is by far most frequent among children and young persons. Most deaths occur from twenty to thirty years of age. In children the disease tends to involve a number of organs; in adults it is more localised. The glandular system is very frequently affected in the former.

A number of causes which tend to lower the state of general health act as important predisposing causes of tuberculosis, or of the local development of tubercle. Among these may be specially enumerated imperfect ventilation, want of fresh air, and close confinement; over-crowding; want of exercise; constant residence in a humid atmosphere; unhealthy, insufficient, or indigestible food, including the milk of mother or nurse; intemperance; interference with the free expansion of the chest, due to clothing or occupation; previous diseases, such as measles, hooping-cough, fevers, as well as many chronic diseases; long-continued dyspepsia; prolonged lactation; excessive sexual indulgence; excessive mental labour and depressing passions. Many of these are frequently found acting in concert, especially among the poor and hard-worked inhabitants of large towns. Imperfect hygienic conditions and improper diet are particularly liable to affect children injuriously.

It is believed by some that tuberculosis is infectious through the medium of the breath and exhalations, but there is no adequate foundation for this idea. Nor is there any reason to suppose that the disease is transmitted by vaccination.

Anatomical Characters.—The typical form of true tubercle almost universally recognised at the present day consists of certain minute bodies, termed *grey granulations* or *miliary tubercles*. These appear as small nodules or granulations about the size of a mustard or millet seed, generally roundish but sometimes slightly angular, well-defined, firm, of a greyish-white or pearly-grey colour, more or less translucent, and non-vascular. These may be quite separate and distinct, or collected into irregular groups, their individual outline being then rendered indistinct. In some structures, however, tubercle is more diffused, and appears as a greyish *infiltration*, which presents a smooth and dense section; but many so-called tubercular infiltrations are probably inflammatory in their origin. In its earliest stage tubercle is not visible to the naked eye, and it is by continued growth and agglomeration of fresh tubercles that it becomes perceptible, appearing either as granulations or infiltrations according to their mode of arrangement.

What has been described as *yellow tubercle* is nothing but nodules or masses of caseous matter, derived either from tubercle or from various inflammatory and other morbid materials which have undergone cheesy degeneration. True tubercle may be mixed with this material; while it also tends to excite inflammation around, and thus its physical characters may be more or less modified.

Microscopic structure.—Tubercle may be described as consisting of the following histological elements:—1. Lymphoid corpuscles, which are very small, round, colourless, translucent, and slightly granular, each containing a single nucleus. 2. Epitheloid cells, of larger size, very delicate, and hence liable to rupture and set their nuclei free. 3. A giant-cell, which consists of a mass of finely-granular protoplasm of very varied form, often presenting processes at its margin, and having imbedded in it a great number of nuclei, chiefly at its periphery and sometimes regularly arranged. 4. Free nuclei. 5. An intercellular substance, which may be either amorphous, homogeneous, and hyaline; granular; or in the form of a fine reticulum or net-work of delicate fibres. There is much difference of opinion among observers as to the presence, arrangement, and relative proportion of these elements. The lymphoid cells are generally considered to be most abundant, but Schüppel describes tubercle as being made up chiefly of epitheloid elements surrounding the giant-cell. This giant-cell has attracted much attention of late years. It occupies the centre of each tubercle and great importance was attached to it by Schüppel and others, but Friedlander has since shewn that it is found in many healthy and morbid products, as well as in tubercle. Tubercle has been distinguished by some writers as cellular and fibrous, according to the proportion of cells and fibrous reticulum entering into its formation. Friedlander, however, insists that in recent tubercle no fibres are visible, and that the appearance is due to the hardening processes employed in its preparation for microscopic examination. Tubercle does not contain any vessels or lymphatics of its own, but it may involve those belonging to the original tissue, and also pigmentary matters. As tubercle undergoes degenerative changes its microscopic appearances alter materially.

Changes and terminations.—Some very important changes are liable to take place in connection with tubercle. 1. *Absorption.*—It is probable that tubercle may be absorbed after it has undergone degenerative changes. 2. *Caseous degeneration.*—The want of vitality of tubercle renders it very liable to this change. The process begins in the centre of the granulations, causing them to become yellow and opaque. Ultimately the material often becomes so softened as to be converted into a purulent or curdy-looking fluid, simulating an abscess; or a firm cheesy mass is produced, which may become encapsuled. As the cheesy degeneration proceeds, the microscopic appearances alter, the cells shrivelling and breaking up, while granules, oil-particles, and cholesterine appear in abundance, finally nothing but a granular debris remaining. 3. *Calcification.*—This frequently follows caseation, the substance consequently becoming inert. Sometimes the calcareous matter is subsequently discharged, or is surrounded with a fibrous capsule. 4. *Elimination and its results.*—After the process of softening has been completed, the material is often eliminated, thus giving rise to ulcers on mucous membranes, and cavities in organs, as is well exemplified in the case of the intestines and lungs. These may ultimately heal up and a permanent cure result, the cicatricial tissue formed being very prone to contract. More commonly however, the destructive process extends, owing to the formation of fresh tubercles on the walls of the ulcer or cavity. Occasionally a cavity results from the death and discharge of a quantity of tubercle *en masse.* 5. *Fibroid change.*—There is sometimes an increase of the fibrillated stroma, perhaps more frequently than is generally believed, coincident with a disappearance of the cells, and finally the granulation may consist almost entirely of fibrous tissue, becoming dense and hard. This is probably identical with the change which has been described as *cornification* or *obsolescence*, in which tubercle becomes opaque, horny, and blueish-grey.

Tissues and organs affected.—Lymphadenoid tissues are specially prone to tubercle, but it may involve any of the connective-tissues. Several organs or structures may be affected at the same time, but in adults tubercle is often confined to one organ. In most cases of acute tuberculosis grey granulations are seen throughout almost every organ in the body. Parts actively growing are chiefly implicated. The most frequent seats of tubercle are the lungs and respiratory passages; bronchial, mesenteric, and other glands; small intestines; pleura, peritoneum, and pericardium; pia mater; and spleen. It is not uncommon in the kidneys and genito-urinary passages; testes; brain and spinal cord. In other parts it is rare. Tubercle has been described in connection with morbid products, such as scrofulous ulcers, chancres, and cancers. Louis laid it down as a law, that if tubercle is found after fifteen in any part of the body it is certain to be present in the lungs.

PATHOLOGY.—Until within a comparatively recent period tubercle was almost universally regarded as a specific exudation from the blood, at first fluid, but soon coagulating into a molecular blastema, the molecules aggregating together to form cells. This view is not yet extinct, though the researches of late years have satisfactorily proved that it is quite incorrect. Observers, however, are by no means agreed as to the nature and mode of development of tubercle. Some still consider that many of its cells at any rate come directly from the blood, being of the nature of leucocytes; others regard them as being the result of retrograde metamorphosis of pre-existing tissue elements or morbid products. Virchow and his followers believe that tubercle arises from proliferation of the fixed corpuscles of the connective tissues. On account of its structure, which resembles that of lymphatic tissue, tubercle has been regarded as of this nature, and as being merely the result of a hyperplasia or excessive growth of pre-existing adenoid or lymphatic tissue. This is the view strongly maintained by Burdon Sanderson, and one which has found much favour. It is supported by the fact that adenoid tissue is usually very extensively distributed, having been discovered in the peri-vascular sheaths of the small arteries in various parts; beneath the epithelium of serous membranes; around the minute bronchia; under the mucous membrane of the alimentary canal; in the spleen and other glands; beneath the conjunctiva; and in other parts. In the peri-vascular sheaths of the arteries tubercle is described as being very common, the cells increasing at separate points so as to compress or even ultimately to close the vessels.

More recent investigators have described tubercle as originating in lymphatic vessels themselves, by a metamorphosis of their endothelium and outer tissues; around the lymphatics, as the result of a peri-lymphangitis; or in connection with the small blood-vessels. Rindfleisch believes that the lymphoid cells are derived from the endothelium of blood-vessels and lymphatics; the epithelium of serous membranes, the lungs, and kidneys; and the muscular tissue of the bronchia. Others deny that tubercle can arise from epithelium or muscular elements. The formation of the giant-cell has received much attention. Schüppel described it as originating in changes in a small blood-vessel. It has also been attributed to alterations in the endothelium of the vessels; and to aggregation of leucocytes. Klein, whose recent researches into the nature of tubercle are highly important, affirms that in the lungs he has followed the development of giant-cells from the epithelial cells of the alveoli with all possible certainty.

Another pathological question relating to tubercle has reference to its mode of origin or causation. The chief views held on this point may be stated as follows:—

1. That tubercle is merely the local development of a peculiar constitutional diathesis, either hereditary or acquired, to which the term *tuberculosis* is applied.

2. That it may originate from some direct local irritation under certain circumstances, in structures where lymphatic tissues exist, quite apart from any constitutional condition.

3. That it is the product of an infectious disease, being the secondary result of the absorption of cheesy morbid products into the blood, which somehow act as a poison and give rise to a specific inflammation. This view was first advanced by Buhl, and experiments performed upon living animals by Villemin, Lebert, Wilson Fox, Waldenburgh, Clark, Burdon Sanderson, Cohnheim, Feltz, Chauveau, and others, have shown that bodies resembling miliary tubercles can be artificially produced in the lungs, glands, and other organs of animals, especially the guinea-pig. This has been effected by the inoculation of tubercular matter under the skin, as well as of various other cheesy morbid products; by the insertion of putrid meat; by putting a seton in the skin, or even causing a simple wound; by injecting cheesy matter into the serous cavities, bronchia, blood-vessels or heart; and even by feeding animals on caseous tubercle. These artificial tubercles are associated with very numerous inflammatory growths, which rapidly become caseous. These experiments give weight to the infective theory, but some deny that the morbid appearances thus produced have any analogy with tubercle.

Acute general tuberculosis not unfrequently follows some local lesion, especially where caseous matter exists. The same is often true of localised tubercle, as for instance when it is developed in the lungs or lymphatic glands. Niemeyer was of opinion that caseous matter generates tubercle by a local rather than a general infection. The primary channels by which infection is generally supposed to be conveyed are the lymphatics, by means of which the morbid materials may be carried into the blood, being then distributed through the body.

SYMPTOMS.—Much difference of opinion has always prevailed as to whether there is a true *tubercular diathesis*, indicated by any characteristic signs. Many persons become tuberculous who present no evident peculiarities, but the following characters are looked upon as showing a tendency to the disease in children and young persons. They are tall, slim, erect, and delicate-looking, with scarcely any fat; and have usually a pretty oval face, a clear complexion, bright eyes, and large pupils. The skin is very thin, soft and delicate, and through it blueish veins are seen; the hair is fine and silky, often light, the eyelashes being long. They cut their teeth early, and are generally precocious and clever, walking and talking soon. They are excitable and active in body and mind. The ends of the bones are very small and firm, the shafts also being thin and rigid, while the cartilages seem very soft and flexible. The thorax is small, being either long and narrow, or flattened.

The *scrofulous* or *strumous diathesis* is characterised as follows:—The body is short, thick-set, and heavy; the face plain, tumid-looking, with expanded and thick alæ nasi, a low forehead, a large upper lip, and a dull pasty complexion. The skin is thick and opaque, and is very subject to obstinate eruptions of a moist character, with a tendency to the formation of scabs. Chronic abscesses or exudations are also liable to form in the subcutaneous tissues. Scrofulous children often exhibit the phlegmatic temperament, are inactive and languid in mind and body, as well as backward in intellect, this being evident in their expression. The bones are thick, with rather large ends, and are liable to caries or necrosis. Chronic disease of the joints is also common. The teeth often decay early. Derangements of the alimentary canal are frequent, and the belly is generally tumid. The lymphatic glands usually exhibit marked changes. They become enlarged chronically, the enlargement having been attributed to chronic inflammation, hyperplasia of the normal tissues, or the actual development of tubercle; and this is very apt to end in caseous degeneration or slow and unhealthy suppuration, Unhealthy inflammation of mucous membranes is very frequent, the products being rich in cells and of a sticky character, while the membrane itself is the seat of an exudation containing abundant cells; it often ends in ulceration. Ophthalmia, tinea tarsi, ozœna, otitis with otorrhœa, throat-catarrh, and catarrh or more serious inflammation of the alimentary or respiratory mucous tracts are common. Scrofulous individuals are very liable to the development of tubercle. They may be the subjects of pyelitis, cystitis, or catarrh of the vagina or vulva.

The local development of tubercle as a chronic disease is attended with corresponding local symptoms; as well as with much general disturbance as a rule, in the way of fever, emaciation, debility, anæmia, night-sweats, &c. These will be more particularly considered when treating of the individual diseases of organs.

ACUTE TUBERCULOSIS. It is necessary briefly to allude to the symptoms which are associated with the deposit of tubercle as an acute affection. Generally almost all the organs in the body are involved under these circumstances, but only the lungs and brain usually reveal any local signs, and these are often very obscure.

Three forms of acute tuberculosis have been described, the *insidious*, *acute febrile*, and *adynamic*, but all grades are met with, and the duration and course of the disease are very variable. At first there may be merely languor, heaviness, irritability, or restlessness; derangement of the digestive organs, with offensive stools; irregular fever, the temperature being sometimes very high; and rapid wasting. Or repeated rigors occur, followed by high fever, with an extremely rapid pulse, much constitutional disturbance and prostration, and profuse sweating. Head symptoms are severe, and there is a great tendency towards typhoid symptoms, such as a dry brown tongue, sordes, and a feeble pulse. Breathing is very hurried, and there may be some cough, but no marked physical signs can be detected in the lungs. Ultimately evidences of the presence of tubercle in certain structures often appear, in the form of tubercular meningitis, peritonitis, and other lesions.

DIAGNOSIS.—It is always important to recognise any tendency to tubercular disease when it exists, especially in young persons, and this depends upon an acquaintance with the family history, as well as upon what the examination of the patient reveals. The diagnosis of local tubercle rests upon the presence of local signs along with constitutional symptoms.

Acute tuberculosis is by no means always easy to diagnose; it may closely resemble fevers, especially typhoid. It should always be remembered in obscure cases occurring amongst children. The absence of the peculiar symptoms of the fevers or of any eruption; the range of temperature; extreme frequency of the pulse; very quick breathing; severe and rapid course; and local symptoms present, will usually enable the diagnosis to be made.

Prognosis. The existence of a distinct tuberculous or strumous diathesis is a serious matter. The prognosis of its local development will depend upon the seat and extent of the mischief, and various other circumstances. Acute tuberculosis is an extremely grave condition, being almost always fatal.

Treatment.—When there is any tendency to tubercle all hygienic conditions should be rigidly attended to. Fresh air and sunlight; proper exercise; warm clothing; change to the sea side, with salt-water baths; nutritious diet carefully regulated, with plenty of good milk; and the avoidance of undue mental labour, are the chief things required. The digestive organs must be kept in order, and all sources of irritation in connection with them at once removed. Every cause likely to lead to lung-affections must be carefully avoided, and it will be well to examine the chest from time to time, and to treat the slightest pulmonary complaint immediately. Cod-liver oil; iron in various forms, especially steel wine; and tonics properly administered, do a great deal of good in these cases. The treatment of local deposits will be considered in future chapters. In acute tuberculosis nothing is of much avail, but quinine in full doses; cold externally; and ice to the head might be tried; with supporting diet and stimulants.

Chapter XXXV.

CARCINOMA—CANCER—MALIGNANT DISEASE.

Cancer is a constitutional affection attended with the formation of new growths of a malignant nature. Though mainly a surgical disease, yet it not uncommonly comes under the observation of the physician, and therefore a brief general consideration of the subject is necessary in this work.

Etiology.—Cancer is decidedly a hereditary disease. Age exercises a marked influence upon its occurrence, nature, and seat. It is rare in the young, being far most common after middle life, and the mortality from this disease increases as age advances. In early life the softer varieties are met with, and the lymphatic glands are liable to be involved. Primary cancer is chiefly observed in organs which have been functionally very active, but whose functions have ceased to be performed. Women suffer more than men, on account of the frequency with which the uterus d mammæ are attacked. The digestive organs, bones, and skin most affected in males. Anxiety, mental distress, and a de-ssing climate seem to act as predisposing causes.

njury, excessive use of a part, or some other irritation may as the *exciting cause* of a local growth; and some patholo-ts consider cancer as essentially local in its origin.

NATOMICAL CHARACTERS.—Different classifications have been made he forms of cancer, but they may all be arranged under the owing varieties:—1. *Scirrhus.* 2. *Encephaloid.* 3. *Colloid.* 4. *thelioma.* Each of these requires separate consideration.

. *Scirrhus, fibrous, or hard cancer.* This variety either infiltrates ues or forms distinct tumours, which are irregular, but never of y large size. The growth is often depressed, and causes kering of overlying structures. The consistence is very hard l firm, sometimes approaching that of cartilage. A section is y, blueish-white, or whitish, and glistening, while opaque fi-us bands are seen intersecting it. There is very little vascu-ity. The outer part of the growth is less dense, and yields a lky juice on scraping.

2. *Encephaloid, medullary, or soft cancer.* Assuming the form of nours, or being infiltrated, encephaloid increases with great pidity, forming considerable masses, which are more or less oulated. The substance is soft and brain-like, and on section esents a pulpy appearance, especially towards the centre, vary-g in colour from white to crimson according to its degree of scularity, and not uncommonly presenting small extravasations blood. A large quantity of juice can be expressed. This form cancer may produce very vascular fungous growths, then called fungus hæmatodes," and all grades are met with between it and cirrhus.

3. *Colloid, alveolar, or gelatiniform.* Many consider this variety as erely one of the other forms which has undergone colloid egeneration. It generally infiltrates, but sometimes forms lobu-ated masses, which have a tolerably firm, uniform consistence.)n section roundish spaces or alveoli are seen, having fibrous walls nd containing the colloid substance, which is of more or less lue-like consistence, glistening and translucent in appearance. ither colourless or greyish-yellow.

4. *Epithelioma, epithelial cancer, or cancroid.* Generally observed n connection with the skin or a mucous membrane, epithelioma ommences either as a hard nodule, or as a small excoriation or lcer. The latter has indurated edges, with an irregular, grey or loody surface, which is often papillated and villous or nodulated. he consistence is generally firm, but may be soft and friable. he cut surface is greyish-white, or presents numerous opaque pecks and white lines of fibrous tissue; a small quantity of ilky granular fluid can be expressed, which will not mix with ater.

Other varieties of cancer are described as *melanotic*, which con-ins much pigment, being most commonly encephaloid; *cystic*, where cysts are developed; *chondroid*; *osteoid* or bony; and which affects mucous surfaces, presenting villous processes.

Structure. All the cancers consist of cells enclosed in the m of a fibrous stroma, these varying greatly in their proportions different forms. The cells are of large but very variable present diverse and curious forms; and contain one or more with nucleoli, as well as usually a greater or less number molecules. Each nucleus is large, clear, and well-defined, tric, round or oval in shape, and encloses one or more nu Often abundant free nuclei are present. The expressed contains a quantity of these cells, nuclei, and granules. stroma is generally firm and fibrous, the fibres being delicate or coarse; but if it has rapidly developed, it prese embryonic structure. In it the vessels are solely distribute its fibrous bundles intersect in all directions, forming a com cating network within the alveoli of which the cells are gr Lymphatics have been found accompanying the blood-vessel they communicate with the alveoli.

In scirrhus the cells, though they may be abundant a speedily disappear, and the fibrous stroma is greatly in especially towards the centre of the growth, where finally n at all can be discovered. In encephaloid, on the other han cells are greatly in excess, develope rapidly and as speedi generate, becoming granular and the nuclei being set free. is but little stroma, which is soft, delicate, and very vascular. loid is in great part structureless, but some cells are present, and spherical, often having a lamellar outline, and cont some of the colloid material. Epithelioma presents gene large number of cells, which, with few exceptions, are excee like those of squamous epithelium, but are subject to great tions in shape from mutual pressure. They tend to form p concentric globes or nests, increasing from within, so th outer layers are hardened and flattened. Ultimately the groups may become dry, firm, and brownish-yellow. A va amount of stroma is present.

Cancerous growths are very liable to fatty degeneration, e ally the softer forms, and as a result the cells become granular and softening takes place, or parts of the growth assume a caseous appearance. Calcification is very u mon. Melanosis and colloid are generally considered as for cancer which have undergone these peculiar degenerations. cancers tend to ulcerate, the ulcers having no disposition to but being on the other hand inclined to spread.

Organs and tissues affected.—Scirrhus is usually observed i mammary gland, uterus, stomach, rectum, or skin. Encepl affects chiefly the bones, testicles, eyes, and internal organs, e ally the lungs, liver, kidneys, brain, and spleen. Colloid pa larly involves the stomach, but is sometimes seen in the ome intestines, and other parts. Epithelioma grows in connection the skin or a mucous surface, but by extension may invade any tissue. Its ordinary sites are the lower lip, the tongue, ey cheeks, scrotum, prepuce, labia, uterus, or bladder. In exceptional cases internal organs are involved.

Several parts may be attacked, either simultaneously or usually in succession. In the latter case the original deposit is said to be *primary*, and those which follow are named *secondary*. Secondary deposits are frequent in internal organs, and are generally of the same variety as the primary growth, but scirrhus is often followed by encephaloid in internal organs. Malignant growths show a marked tendency to spread and to infiltrate surrounding tissues, so that no line of demarcation is observed; in rare instances a kind of capsule forms.

PATHOLOGY.—Two very opposite views are entertained as to the origin of cancer, viz:—1. That it is primarily a constitutional or blood-disease or cachexia, of which the formation of malignant growths is but a local manifestation. 2. That it is in the first place a local disorder, produced by some irritation; and that the blood is only changed secondarily, as the result of absorption of morbid materials from the local formation. It is not at all improbable that both these theories are correct in different cases. Secondary growths arise in consequence of absorption by the blood-vessels and lymphatics, by which the cancerous matter is conveyed to distant parts, especially those more immediately associated with the structure first affected; neighbouring absorbent glands are very liable to be involved.

The stroma of cancer consists partly of the original cellular tissue, but is chiefly derived from hyperplasia of the connective-tissue elements. The cells are developed by the proliferation of pre-existing cells; some think they are only derived from epithelial structures, but others believe that they also originate in connective-tissue corpuscles and migrated white blood-corpuscles.

Dr. Creighton in his recent researches respecting malignant tumours has arrived at the following conclusions:—In secondary tumours the parenchymatous cells, and not the cells of the connective tissue of the organ, are the elements that undergo transformation. This transformation consists in a vacuolation of the protoplasm of the cells, with other associated changes; the products remaining as tumour-cells or as indifferent cells which may further develope into connective tissue. Vacuolation has been otherwise described as endogenous cell-formation, a mode of cell growth that is essentially heteroplastic, the products being alien to the original tissue. Both in physiology and pathology it is a familiar process, as for example, in the development of colostrum-cells, spermatozoa, mucous and salivary corpuscles, and the goblet-cells so abundantly found amongst the epithelium of mucous surfaces; and Dr. Creighton concludes that the process of secretion in the epithelial cells of mucous surfaces is essentially a process of endogenous cell-formation. This being the case, a true physiological basis has been established for the theory of the formation of secondary malignant tumours. The theory may be extended to the origin of primary malignant tumours in epithelial parts, for it is evident that if the epithelium, in the exercise of its function, endogenously produces solid elements instead of fluid substance, the result will be a heteroplastic growth. The growth of the malignant tumours on the mammæ for example may be explained in this way.

Primary and secondary malignant tumours have a distinct genetic relation to each other. The primary precedes the secondary in point of time; a remarkable family-likeness can in most instances be traced between them; and, what is of the greatest significance, the process of vacuolation or endogenous cell-growth, by which the secondary tumour is developed, bears a remarkable resemblance to the first changes in the ovum after impregnation. To explain the origin of secondary tumours in a healthy organ, the influence of the primary or parent tumour must manifestly be assumed, an extraneous influence operating by the mechanism of endogenous cell-formation. This influence, Dr. Creighton contends, is comparable to a spermatic influence, which is exercised in some unknown manner by the parent tumour. Dr. Creighton attempted to produce cancer artificially, but without success.

Symptoms.—Cancer usually gives rise to two sets of symptoms, viz., *general* and *local*. The general symptoms may precede the local, and include more or less wasting; a peculiar sallow cachectic look, with a yellowish earthy tint of countenance; a careworn, gloomy expression; debility and languor; anæmia and its accompaniments; with irregular fever. These vary much in their intensity according to the part affected; and the rapidity of the growth and nature of the cancer, being most marked in connection with the scirrhus. The local symptoms may be summed up as pain and tenderness or other subjective sensations, often very severe, the pain being frequently of a lancinating or burning character; interference with the functions of the part affected, in many cases of serious moment; symptoms due to pressure upon, or irritation of, neighbouring structures; and objective or physical signs afforded by the growth itself. The duration of cases of malignant disease is very variable, but is rarely prolonged, and sometimes they run an acute course.

Chapter XXXVI.

DIABETES MELLITUS—GLYCOSURIA.

Etiology and Pathology.—A small quantity of sugar is often temporarily present in the urine under certain circumstances, especially after taking food containing much sugar or starch; after the administration of chloroform; in poisoning by strychnine or woorara; in various conditions which interfere with respiration, such as fits of asthma and hooping-cough; in certain nervous diseases (epilepsy, tetanus, apoplexy, &c.); and in connection with injuries to the nervous system, liver, and other parts. Glycosuria can also be induced experimentally in several ways. In the disease now under consideration, however, the urine permanently contains sugar, generally in large proportion, and in most cases this is accompanied with serious constitutional disorder. Many views have been advanced to explain the pathology of diabetes, but in the present state of knowledge it must be classed as a general or constitutional disease. There is every reason to believe its phenomena are due to some derangement of the so-called glycogenic functions of the liver, though what the exact deviation is, and how it is brought about, are by no means settled points. It seems quite certain that in health an amyloid, fermentable substance, capable of conversion into grape-sugar, and named glycogen or animal or hepatic dextrine or starch, is formed in the liver. It is also proved that a peculiar ferment exists in the blood capable of converting this into sugar. One class of physiologists believe that in the normal state this conversion is constantly taking place in the liver, the sugar passing on into the circulation through the hepatic vein, being gradually oxidised and destroyed in the blood. Another class deny that there is any such change in health, and Dr. McDonnell has advanced the theory that the hepatic dextrine is not converted into sugar at all, but unites with nitrogen to form a new protein-compound resembling casein. Those who hold the first view maintain that diabetes consists either in an increased formation of sugar in the liver, or in a diminished destruction of that normally produced; hence it accumulates in the blood and is excreted by the kidneys. The second class of pathologists are of opinion that under certain conditions the ferment reacts upon the glycogen in the liver, and that this leads to an unnatural production of sugar.

The probability is that the disorder of the hepatic glycogenic function, whatever it may be, can be brought about in several ways. Experiment, as well as clinical and *post-mortem* examination, has proved that in many cases it depends upon a morbid condition of certain portions of the nervous system. By irritating or injuring the portion of the sympathetic which sends branches to the liver, certain parts of the spinal cord, or the floor of the fourth ventricle, glycosuria may be induced. It is believed that this nervous disturbance acts through the vessels of the liver, inducing paralysis of their circular muscular fibres, with consequent passive dilatation and congestion, so that the ferment and amyloid matter come into close contact; or that the nerves directly affect the amount of glycogen formed and the rapidity of its conversion into sugar.

The *exciting causes* of diabetes are in many instances by no means clear. Among those to which the disease has been mainly attributed are exposure to wet and cold; drinking cold water when heated; abuse of alcohol, sugar, and starchy substances; strong emotional disturbance or excessive mental work; injuries to the head, spine, and various other parts, or general concussion of the body; organic diseases of the brain and spinal cord. In some cases the disease seems to have followed the prolonged action of depressing mental causes, combined with influences which tend to impair the health, as, for instance, grief and anxiety with long-continued watching over the sick, or worry and close confinement in business. Occasionally it has appeared to be the sequela of some acute febrile disease. Diabetes is most common in adults, from 25 to 65 years of age, especially during the period of development and exercise of the sexual functions; in males, after the period of puberty; and in persons residing in cities and manufacturing districts. In some instances there appears to be some hereditary influence, or the disease tends to run in families.

Anatomical Characters.—There are no morbid appearances at present recognised as peculiar to diabetes, but the most important lesions observed are those associated with the nervous system. In some cases there is obvious organic disease, such as a tumour affecting the medulla or pons, or pressing upon the sympathetic. In others minute microscopic examination is necessary in order to detect the changes. Dr. Dickinson has described peculiar alterations in various parts of the nerve-centres, especially about the medulla and pons, in the way of dilatation of the arteries, followed by degeneration and destruction of the nerve-elements around them, leading to the formation of excavations, which may be of some size. Most authorities deny that there is any special morbid condition of the liver, though some observers have described certain peculiar changes in its general or microscopic characters. The kidneys are often diseased, but this is a secondary result of the diabetes, the most frequent morbid state being some form of Bright's disease. The lungs are also frequently affected, there being usually some form of phthisis, occasionally pneumonia of a low type or gangrene. The heart is generally small and wanting in tone. There is a tendency to serous inflammations of a low type; and to inflammation of other structures ending in suppuration or gangrene. Hypertrophy of the pancreas is said to be comparatively frequent. The stomach is generally dilated, its mucous coat thickened and softened, and its muscular coat sometimes hypertrophied.

Symptoms.—Clinically cases of diabetes differ remarkably in their severity, one class presenting but slight symptoms; another being accompanied with marked local and constitutional disturbance. In a typical instance the symptoms may be arranged under the following heads:—

1. *Urinary organs and urine* .—Micturition becomes more and more frequent, and the urine is increased in quantity. It is irritating in quality, and hence often causes in the male a sense of heat or burning along the urethra, or slight inflammation, excoriation, or even ulceration about the orifice; while in the female the vulva is frequently much irritated. This may lead the patient to indulge in masturbation. Pain and tenderness are often felt over the region of the kidneys. The quantity of urine may amount to 8, 12, 20, or even 30 pints in the 24 hours; it is usually very pale and bright, the more so in proportion to its quantity; possesses a sweet taste, and occasionally a sweetish odour; has a high specific gravity, generally about 1040, but it may range from 1015 to 1060 or more; ferments rapidly if kept in a warm place, with formation of torulæ, becoming opalescent or depositing a sediment; while it yields more

or less sugar to the usual tests, which are described under "Examination of Urine." Many different statements have been made as to the proportion of urea and uric acid present; probably they are as a rule absolutely increased, but relatively to the water diminished. The quantity of water is about equal to that taken in. The amount of sugar is greater after food has been taken, especially such as contains much sugar or starch, being much less when the diet is restricted to animal food. In any pyrexial condition it becomes greatly diminished, or may even be absent altogether. The proportion of sugar usually present ranges from 8 to 12 per cent., and from 15 to 25 ounces are discharged daily on the average; but the quantity may vary from less than an ounce to two pounds or more. The urine may contain albumen and occasionally a little blood; it is also stated to yield fat sometimes, or to resemble chylous urine.

2. *Digestive organs.*—A very constant symptom of diabetes is insatiable thirst, attended with a dry, parched, and clammy condition of the mouth and throat, due to the presence of sugar in the blood, which creates a demand for much liquid. In many cases also there is excessive appetite, but disinclination for food is not uncommonly observed. The tongue generally presents a peculiar irritable, red, clean, cracked, and dry appearance; it may be moist and furred. Sponginess of the gums with tendency to bleed, and rapid destruction of the teeth are frequently noticed. The saliva contains sugar, and is said to be very acid sometimes, owing to the conversion of this into lactic acid. The breath has in some cases a distinctly sweet or ale-like odour. Dyspeptic symptoms are common, such as epigastric fulness or sense of sinking, flatulence, gaseous and acid eructations. As a rule the bowels are constipated, with pale, dry, and spongy stools; but there may be diarrhœa or dysenteric symptoms, especially towards the close.

3. *General symptoms.*—The aspect of the patient is in many instances strikingly suggestive of diabetes, the prominent characters being emaciation, often extreme, involving not only the fat but also the muscles, which feel flabby and soft; a peculiar dry, harsh, scurfy condition of the skin; and a distressed, worn, and suffering expression of countenance. The patient feels very weak and languid, often chilly, indisposed for any bodily or mental effort, and complains of pain and soreness in the limbs. Some œdema of the legs is frequently observed, and occasionally dropsy in other parts. Sometimes the temperature is markedly reduced, and in any pyrexial condition it is not nearly so much elevated as it otherwise would be. Sexual inclination and power are commonly greatly diminished or lost. The mental condition and disposition become usually much altered in established cases, as evidenced by decline of mental vigour, disposition to lassitude or drowsiness, lowness of spirits, petulance and irritability, or decline in firmness of character and moral tone. Temporary dimness of vision is not infrequent. The blood contains sugar, which is also found in the various secretions.

4. *Complications.*—Most of the complications of diabetes have been

already alluded to in the account of its morbid anatomy, the most frequent symptoms coming under this head being those indicative of phthisis. Here may also be mentioned the not uncommon occurrence of boils and carbuncles; chronic skin affections (psoriasis, &c.); gradual permanent blindness from atrophy of the retina; and cataract, the last being almost always of the soft kind, and attributed to imbibition of sugar, which, it is said, has been detected in the lens.

The precise clinical history of diabetes varies much in different cases, as regards the intensity and exact combination of the symptoms described, and the rapidity of its progress. Ordinarily the course is essentially chronic, the symptoms setting in very insidiously, and becoming gradually but progressively worse. It may be that for a considerable time the advent of diabetes is only indicated by slight general symptoms, such as debility, languor, and some loss of flesh. Occasionally the disease runs an acute course; or it may exhibit remissions from time to time. It is frequently observed that the symptoms are more intense at the early stage than subsequently. Towards the close they often change, the urine and sugar diminishing in quantity, albuminuria setting in, there being complete disgust for food, and hectic or colliquative diarrhœa occurring. The fatal result usually arises from gradual exhaustion; blood-poisoning, leading to stupor ending in complete coma, or occasionally convulsions; or from complications. Now and then death takes place quite suddenly.

Diagnosis.—When diabetes is well-established there ought to be no difficulty in detecting it. The urinary symptoms and characters of the urine, those referable to the alimentary canal, and the general symptoms, are highly characteristic. The rule of always examining the urine carefully when the health is persistently out of order, and especially if there are the slightest symptoms suggestive of this disease, will often lead to a diagnosis at an early period. If a patient complains of much irritation about the external genital organs, or if a child is detected masturbating, diabetes should always be borne in mind. The mere finding of a trace of sugar in the urine is not, however, evidence of the presence of diabetes. It must be in some quantity, persistent, and attended with polyuria. Not often is there any possibility of finding out the exact morbid condition upon which the diabetes depends.

Prognosis.—Confirmed diabetes is a very serious disease, a large proportion of the cases ending fatally, and the average duration is stated to be about from one to three years. In many instances, however, much improvement may be effected; and in some recovery can be brought about. The chief circumstances which influence the prognosis are age, it being worse in very young than old persons; the general condition of the patient, the disease being much less serious in stout persons; the cause of the complaint and its duration; the amount of sugar and urine passed; the severity of the general symptoms; the presence or absence of complications, as well as their nature; the progress of the case; the results of treatment, and whether this is properly carried out. Any person suffering from diabetes should be particularly cautioned against exposure and other causes of disease.

TREATMENT.—Cases of diabetes must necessarily call for much diversity in their management, but there are certain general principles to be followed, to which attention will now be directed. At the outset it is most important to impress upon patients that they must be prepared to place themselves under strict discipline and guidance, and that upon themselves much of the success of treatment will depend.

1. The first indication almost universally recognised in the treatment of diabetes is regulation of the diet. The object is to prohibit or restrict such articles as contain sugar or starch, especially ordinary bread or flour; sugar in any form; honey; vegetables and fruits containing starch or sugar (potatoes, peas, beans, carrots, turnips, parsnips, strawberries, raspberries, plums, gooseberries, currants, apples, pears, &c.); rice; prepared varieties of starch (sago, macaroni, tapioca, &c.); shell-fish, and the soft parts of crabs and lobsters. Animal food, including meat, poultry, game and fish, should be the main diet, with the exception of liver. The chief substitutes for bread are bran-cake or biscuits, gluten bread, almond rusks and biscuits, or thin slices of bread toasted until they are almost black; eggs, butter, cheese, broths, good soups, and jellies are admissible; also vegetables not containing sugar or starch, such as cabbage, Brussels sprouts, broccoli, cauliflower, lettuce, cress, mustard, and celery.

The question of drink is also of much moment. Milk is theoretically contra-indicated, because it contains much sugar, but it has been found in some instances that when given in moderate quantities it is not injurious, and may even prove beneficial. Therefore it is allowable to try the effects of a regulated amount in any individual case, and be guided accordingly. It may be mixed with lime water or soda water. Cream may be given in abundance if it agrees. Dr. Donkin has advocated the treatment of diabetes entirely by skimmed milk, in quantities of from 6 to 8 or even 12 pints daily, and continued for several weeks if necessary, no other food or medicine being allowed. My experience of this treatment is anything but favourable, but I have found benefit from giving a considerable quantity of skimmed milk daily, along with other food. The balance of evidence is decidedly against the use of alcoholic stimulants to any extent. A small quantity is frequently serviceable, those forms of stimulant being employed which are most free from sugar, viz., dry sherry, bitter ale, brandy or whiskey, well-diluted claret, and Burgundy. Tea and coffee without sugar may be allowed, and also cocoa made from the nibs, provided it agrees. It is not desirable to restrict the quantity of liquid too much, but it must be moderated so far as the feelings of the patient will permit. Most injurious is it to knock off liquids suddenly, and I have known a rapidly fatal issue result from this cause. Thirst may be relieved by iced water; acid drinks, of which a solution of phosphoric acid has been much recommended; or solution of cream of tartar. Prout affirmed that tepid liquids give more relief than cold. The Bristol Hotwells, Carlsbad, and Vichy waters, are said to have an influence on diabetes, in addition to being serviceable as a drink.

It is highly important to attend to certain matters in regulating the diet. 1. The change should be brought about gradually and not suddenly. 2. Frequent variations in the food should be made amongst those articles which are permissible. 3. In many cases it is necessary to watch carefully that the regimen laid down is strictly attended to, especially at the early period of treatment, and among ignorant patients. 4. Every individual case must be studied for itself, and the advisability of persevering in the restricted diet or not judged by the results. In some instances, where there is much loathing of the food, a little bread is often of great benefit. Again, if a fair trial of the recognised diet seems to lead to no improvement, or if the general condition is getting worse, as may happen especially when the disease is very advanced, it may be desirable to let the patient follow his own inclination, guided by intelligence; sometimes also patients cannot possibly take the prescribed food, and then a mixed diet must be permitted.

Allusion may be here made to the saccharine treatment of diabetes, in which sugar and honey are administered in considerable quantities, any diet being allowed. This has been proved to be decidedly injurious in the majority of cases.

2. General hygienic management is highly important. The patient should be completely clad in flannel, and have two or three warm baths every week. Change of air, especially to the sea-side, with sea-bathing, is useful in some cases.

3. Numerous medicines have been brought forward, supposed to have a direct curative influence upon diabetes, especially in limiting the discharge of urine and sugar. The principal of these include opium, given in gradually increasing doses up to gr. vi—xx daily, which certainly seems to be useful in some cases; alkaline bicarbonates, pepsine, rennet, arsenic, iodine, bromide of potassium, and peroxide of hydrogen. The evidence in favour of the value of most of these is very slight.

4. Symptomatic treatment often calls for attention in diabetes, this being especially directed to the digestive organs; the general condition and state of the blood; nervous disturbance, in the way of sleeplessness and restlessness; and to the various complications. These must be managed on ordinary principles. Iron and tonics are often of much service. Codeia, in doses of gr. $\frac{1}{4}$ to gr. $\frac{1}{2}$ every night and morning, has been found useful as a sedative.

Diabetes Insipidus.

This affection is characterised by great thirst, with an increased flow of urine, which is watery and of low specific gravity, but does not contain any sugar or other abnormal ingredient. The proportion of solids discharged in the twenty-four hours may be normal, excessive, or below par. Frequent micturition is often observed. Occasionally the patient enjoys excellent health, but more com-re are more or less of the symptoms noticed in diabetes specially a dry and harsh skin, loss of flesh and weak- dryness of the mouth. In most cases the appetite is not but sometimes it is voracious. As a rule the complaint in its onset and course; occasionally it sets in suddenly. is extremely exceptional, but death usually results from nic complication.

logy of diabetes insipidus is very obscure. The probable cause is dilatation of the renal vessels from paralysis cular coat, resulting from deranged innervation. The an be induced by irritating a certain spot in the floor th ventricle. It has also been attributed to injury of the ntres or sympathetic; organic diseases of the brain and ressing emotions; hysteria, neuralgia, and other nervous Among other alleged causes are exposure to cold; old water when heated; violent effort; previous febrile matory attacks.

NT. Opium, valerian, camphor, nitrate of potash, iron, e of potassium are the chief remedies recommended. al of liquids has not been successful. The use of the alvanic current, applied over the hypochondrium, has cated.

II. LOCAL DISEASES.

In treating of local diseases, it is proposed to indicate the general clinical characters which belong to each organ or system, and the methods to be employed in their investigation, before entering upon the consideration of the individual disorders to which they are liable. It may be stated once for all, however, that it is always of essential importance to study the constitutional condition of the patient, as this materially affects the diagnosis, prognosis, and treatment of local affections. Some of the more important symptoms will be discussed as fully as space will permit.

CHAPTER I.

DISEASES OF THE MOUTH, TONGUE, AND SALIVARY GLANDS.

CLINICAL CHARACTERS.—Important indications are often afforded by the mouth and tongue with regard to the state of the system generally, and of the alimentary canal, but these parts may also be the seat of local affections, to which attention will now be directed. Their presence may be revealed by some or all of the following symptoms and signs:—

1. Altered sensations, such as pain, soreness, a feeling of heat or dryness, and various derangements of the sense of taste. 2. More or less interference with the actions carried on in the mouth, viz., mastication, sucking, the first stage of deglutition, and articulation. These acts are often also attended with pain. 3. Changes in the quantity or quality of the saliva; or the escape of unusual discharges, such as pus, blood, &c. 4. A disagreeable odour of the breath, which may amount to extreme fœtor. 5. Interference with the act of breathing occasionally, owing to mechanical obstruction to the passage of air. 6. A change in colour, or the existence of any swelling, deposit, ulceration, or other morbid condition, as disclosed on a careful examination of the mouth, aided by a good light. At the same time the glands in the neighbourhood should also be examined.

I. INFLAMMATION OF THE MOUTH.—STOMATITIS.

Stomatitis is a very common affection, and occurs under several forms. Its varieties are:—1. Catarrhal. 2. Follicular. 3. Aphthous. 4. Ulcerative. 5. Parasitic. 6. Gangrenous. 7. Mercurial.

ETIOLOGY.—The chief *predisposing causes* of stomatitis are:—1. Age, the different forms being far most common in infants and young children. 2. Improper hygienic conditions, such as want of cleanliness, impure air, unhealthy residence. 3. Errors in diet or an insufficient supply of food. 4. Certain unhealthy conditions of the system, or the presence of certain diseases. The different forms of stomatitis are exceedingly rife among the children of the poor, especially those living in large towns. This applies particularly to the re severe varieties, the gangrenous form being rarely met with cept among this class of patients. Infants are very commonly ected who are brought up by hand or fed on artificial food, or o have suckled too long, or been nursed by an unhealthy mother. ildren who are debilitated from any cause, and those prema- rely born, are also very prone to this class of diseases. They e common in congenital syphilis, and as complications or quelæ of one of the exanthemata. Thrush is frequently asso- ated with typhoid fever, or, in adults, with chronic wasting seases, especially phthisis. Gangrenous stomatitis rarely occurs cept after some acute illness, particularly severe measles.

Exciting causes.—1. Local irritation is one of the most frequent uses of stomatitis. This includes neglect of cleansing the mouth, ritation of dentition, decayed teeth, suckling imperfectly-formed inflamed nipples or for too long a time; as well as all forms of echanical or chemical irritation, heat and cold, excessive smok- g, wounds, ulcers, and other irritating morbid conditions. 2. he milder varieties may be dependent upon disorder of the alimentary canal. Repeated follicular stomatitis in adults generally dicates some gastric derangement. 3. The presence of some ison in the blood frequently excites inflammation in the mouth. his partly explains its occurrence in the acute specific fevers. etallic poisons, however, are those which ordinarily act in is way, especially mercury. 4. Catarrh of the mouth may due to extension of inflammation from neighbouring parts. hus it may be associated with erysipelas of the face, or throat fections. 5. Contagion produces some forms of stomatitis. hrush can be propogated by direct transplantation of the fungus, ough it does not usually spread in this way, but probably is due the presence of the spores in the air, which in the mouth find vourable conditions for their development in the decomposing od and epithelium, aided by the parts being kept at rest, and by ant of cleanliness. Some believe that ulcerative stomatitis is ntagious.

SYMPTOMS. Each variety of stomatitis will need a brief descrip- on.

1. SIMPLE OR CATARRHAL.—When acute, this form begins as nall bright-red patches on the inside of the cheeks or at the ngles of the mouth. Ultimately, by extension and coalescence of e patches, the whole surface may be covered. There is more or ss swelling of the affected parts. At first the surface is dry, but on excessive secretion forms, containing many imperfect cells. uperficial erosions or ulcerations are often produced. The sub- ctive sensations are pain or soreness, heat, a slimy sensation in e mouth, and impaired or unpleasant taste. The breath is often isagreeable. Generally the alimentary canal is out of order, as idenced by a furred tongue, loss of appetite, and, in children, isturbed bowels and flatulence. Children are also irritable and eepless. Catarrh of the mouth often occurs as a chronic affection.

2. FOLLICULAR OR PAPILLARY.—At first little red raised spots are een, which feel hard; these are due to enlarged and obstructed

mucous follicles. As a rule they soften and burst, discharging their contents, and leaving small, circular, well-defined ulcers, with some surrounding redness. A good deal of soreness is complained of.

3. Aphthous or Croupous.—Much confusion has existed with regard to what is meant by aphthæ, but it seems best to restrict the term to certain small ulcerations, which have a special mode of origin. They commence as small whitish or whitish-yellow spots on the lips, cheeks, palate, or tongue, which are often in considerable number and may become confluent. More or less redness surrounds them. These are generally considered to be vesicular and to contain a fluid, which gradually becomes opaque, while the vesicles ultimately rupture. Some, however, regard them as solid exudations under the epithelium, of a croupous nature, which become detached from the circumference towards the centre, leaving superficial ulcerations. This form is usually attended with much pain, rendering sucking, mastication, deglutition, or speaking very difficult to perform. The buccal secretion is increased, and there may be much salivation. The breath has often a very disagreeable smell. Infants are usually feverish and restless, even for some days before the aphthæ appear. They refuse nourishment, but are thirsty. The tongue is furred, and diarrhœa or vomiting may be present.

4. Ulcerative or Diphtheritic—Gyngivitis Ulcerosa.—This is a form of inflammation which usually ends in extensive and unhealthy ulceration, and it may occur as an epidemic. It is regarded by some as of a diphtheritic nature. As a rule it begins on the margin of the lower gums in front, but may extend backwards, or to the lips, cheeks, or tongue. The gums appear much congested, swollen, and spongy; bleed very readily; and seem separated from the teeth. Soon a deposit is observed, in the form of membranous-looking patches, at first whitish, but speedily becoming grey or even black. Tolerably firm and adherent at the outset, and leaving a bleeding surface when detached, the substance shortly becomes soft and pulpy. Some consider that the mucous membrane itself is involved, a diphtheritic slough being formed. The patches usually separate, leaving irregular ulcers, which may spread and run together so as to give rise to an extensive ulcerated line or surface. The margins of the ulcers are raised, the membrane around being congested, swollen, and œdematous. They are usually not deep, and their surface is covered with a pulpy yellowish substance. If properly treated, they generally heal quickly, but in some cases serious results follow, the teeth dropping out and the jaws becoming carious or necrosed.

The subjective symptoms are generally severe. There is a great deal of pain, increased by any movement of the jaws or other local irritation; hence there is much difficulty in chewing or swallowing. The saliva is very abundant, and frequently mixed with blood and other matters. The breath is very fœtid. Often the glands in the neighbourhood are enlarged and tender. In most cases the constitutional symptoms are but slight.

5. Parasitic or Fungous—Thrush—White Mouth.—By these

d other names a variety of stomatitis is described, which depends on the presence of a parasitic fungus, the *oidium albicans*. At st red patches form, on which whitish points appear, which may tend and coalesce into considerable patches of variable thick-ess. They look like curdled milk, being of a soft consistence nd soon easily detached. They consist of epithelium and fat, in hich are imbedded the sporules and filaments of the fungus. The eposit first appears generally about the angles of the mouth, but ay be noticed on any part of this cavity, and even extends occa-ionally to the pharynx, larynx, œsophagus, or, very rarely, to the tomach. There is necessarily a good deal of pain and soreness bout the mouth, which is hot and dry, the saliva being diminished n quantity at first.

Very young infants are subject to thrush as a distinct affection, eing preceded by some slight fever, and attended with digestive isorders, evidenced by vomiting, diarrhœa, pain, tenderness and welling of the abdomen, and irritation about the anus. In most cases, owever, it is associated with some pre-existing disease, especi-ally certain acute specific fevers, and chronic exhausting diseases, such as phthisis. Under these circumstances there may be no symptoms. In connection with the acute specifics it does not add to the danger; but in the chronic affections it is commonly a sign of approaching death.

6. GANGRENOUS—CANCRUM ORIS—NOMA—WATER CANKER.—This is a very rare, but exceedingly dangerous form of stomatitis. It begins insidiously, and almost invariably first affects one of the cheeks, attacking its inner surface. When the patient comes under observation, there is usually a circumscribed hard swelling in the cheek, with surrounding œdema. The skin covering it is tense, shining, and hot, generally red, the colour shading off from the centre, which is bright; sometimes the surface is pale or mottled. The mucous membrane is merely reddened at the outset, but soon becomes discoloured and gangrenous, and a vesicle often rises upon it. Then a small irregular ulcer forms, with jagged, red or livid edges, and a sloughy surface. After a time the central spot of bright redness becomes livid and finally black, being converted into a dry slough, which extends rapidly. At the same time the gangrene is spreading internally, so that finally the entire cheek may be affected, or even one-half of the face or more, while the gums, lips, and tongue are also frequently involved to a variable extent. When the sloughs separate, the mouth is opened up, the teeth often drop out, and the bones may be exposed and necrosed. A hideous excavation with ragged gangrenous edges is left, which may still go on spreading. If the destructive process is checked, the surface may clean, granulate, and cicatrize, but great deformity often results, with adhesion of various structures.

The gangrene does not necessarily spread to the extent just described. It may only cause a hole in the cheek, which ultimately closes up or remains as a fistulous opening. The glands and tissues around are always infiltrated, swollen, and hard.

One of the most striking features of this disease is that pain and tenderness may be either very slight or altogether absent. A large quantity of saliva flows from the mouth, extremely fœtid, and mixed with blood and gangrenous discharges. Serious hæmorrhage does not occur, because the vessels are blocked up by coagula. The breath has an excessively foul, gangrenous odour.

The general symptoms vary considerably, but it is often observed that even when the disease is extensive they are by no means severe. Much will depend upon the previous condition of the patient. There is not much fever as a rule, the skin being cool; and the strength may be fairly maintained for a while, at the same time food being taken eagerly. The pulse at first is rather frequent. As the disease progresses there is a tendency to prostration, the patient ultimately becoming extremely low and asthenic, with a very feeble and small pulse. Food may be taken to the last, and there is much thirst. Diarrhœa often sets in. The patient frequently becomes delirious or drowsy in fatal cases. Death may result from septicæmia or asthenia.

7. Mercurial.—The first effect of mercury is to cause redness and tumefaction of the gums, which feel tender and bleed readily, while the patient experiences a peculiar metallic taste, the saliva is increased, and the breath has a characteristic unpleasant odour. Afterwards superficial greyish sloughs and ulcerations form along the margins of the teeth, and the gums become detached, the teeth loosening or even falling out. There may be extensive inflammation of the mouth and tongue, ending in ulceration, suppuration, or actual gangrene. Salivation becomes very profuse, various discharges being mixed with the saliva. The salivary and lymphatic glands and other structures are swollen and painful, while there is much pain in the mouth and face, with difficulty in moving the jaws and in swallowing or speaking. Only slight constitutional symptoms are usually observed.

Diagnosis.—The different forms of stomatitis are readily recognised when the mouth is properly examined. In infants it is important to bear these complaints in mind, and to look to the mouth should they appear to be ailing. It must also be mentioned that the ulcerative and gangrenous varieties sometimes set in and extend very insidiously, giving rise to little or no disturbance. Fœtor of the breath may lead to their discovery.

Prognosis.—The ulcerative and gangrenous forms of stomatitis may prove serious. In chronic wasting diseases, especially phthisis, the occurrence of thrush may indicate a speedily fatal termination.

Treatment.—The indications for the treatment of the various forms of stomatitis may be summed up as follows:—

1. Hygienic conditions must be properly observed and regulated in every respect. 2. Particular attention is required with regard to diet, especially in the case of infants. If they are suckling, care must be taken that they are not fed too frequently or excessively, and that the nipple is properly cleansed, and in other respects satisfactory. At the same time the mother's health must be looked to, and she must be prevented from using irritating articles of food.

ught up by hand, good milk should be given, and the bottle be kept scrupulously clean and used only at regular intervals. y should also be made as to artificial diet employed, as this n of a very irritating nature. 3. The state of the alimentary frequently needs correction. Aperients are called for in cases, such as castor oil, a dose of jalap with calomel, or rhu- with magnesia. Antacids are also valuable, especially lime with milk, carbonate of soda, magnesia, or chalk. 4. A important indication is to remove or avoid all sources of local tion, such as dentition, bad teeth, and excessive smoking. In se of infants the mouth must be properly cleansed. In mercu- tomatitis, of course the withdrawal of the poison is essential. cal applications.—In simple stomatitis nothing is required, s there is much mucus on the surface, when it is desirable to the mouth out with a weak solution of carbonate of soda or ate of potash. In the aphthous, follicular, and ulcerative , a solution of chlorate of potash is very valuable, either em- d as a mouth-wash, or directly applied with a camel's hair . If there is much irritation, demulcent washes afford relief, as thin mucilage. A weak solution of Condy's fluid is ser- ble for the purpose of checking fœtor. Subsequently astrin- applications are often called for, especially alum in the form of on or powder. The direct application of nitrate of silver to s may be requisite, either in the solid form or as a solution. ush various local remedies are useful, viz., a solution of sul- of soda (ʒ i ad ℥ i); borax and honey; vinegar and water; ote; bromide of sodium with glycerine and water; or solu- f chlorate of potash. Cancrum oris calls for energetic local nent. The gangrenous surface must be at once freely and ually destroyed by strong nitric or hydrochloric acid, the er being preferable, and it may be necessary to repeat the cation. Antiseptic mouth-washes should be freely used, such ne containing Condy's fluid, chlorine, or carbolic acid, which also be employed as dressings. Chlorate of potash solution is valuable in these cases. Poultices externally are also re- d, these being changed frequently, and covered with some eptic. 6. General treatment.—In the majority of cases of sto- is no general treatment is required, but if the health is low- from any cause, it is important to use means for its improve- . When there is extensive ulceration, tonics, tincture of steel, nutritious diet are often of essential service, and the internal nistration of chlorate of potash leads to most satisfactory re- . In gangrenous stomatitis one of the most necessary parts of eatment is to keep up the patient's strength in every possible by means of nourishing soups, wine or brandy, ammonia and tion of bark, mineral acids, or quinine with iron. Chlorate tash solution should also be employed as a drink.

II. GLOSSITIS.—PARENCHYMATOUS INFLAMMATION OF THE TONGUE.

This is an inflammation of the actual substance of the tongue, leading to an exudation among its muscular fibres, and exceptionally involving the latter also. It is a rare but very acute and dangerous affection.

ETIOLOGY.—1. Some direct irritation is almost always the cause of glossitis, which may result from mechanical injury; swallowing boiling liquids; acrid or corrosive substances; or the stings of insects, especially the bee and wasp. 2. It is very rarely due to some poison in the blood, either mineral (mercury), animal, or vegetable. 3. Occasionally glossitis occurs as a complication or sequela of one of the exanthemata. 4. Very rarely it originates from extension of inflammation from neighbouring parts, such as the tonsil.

SYMPTOMS —The entire tongue is usually implicated, and presents the following characters. It is enlarged, so that the mouth cannot contain it, and may project some distance beyond the teeth, being marked by them at the sides, and the pressure may lead to ulceration. The surface is dark-red, generally smooth, shining, and tense, but it may be fissured. The dorsum is covered with fur, which tends to be brownish. Owing to its protrusion and exposure, the tongue soon becomes dry. If resolution does not rapidly take place, small abscesses may form, which coalesce and then burst or are opened. Rarely gangrene occurs. The tongue may remain large for a long time. This condition is attended with considerable pain and tenderness, and a feeling of heat, as well as other uncomfortable sensations. All the functions of the tongue are necessarily greatly interfered with. Occasionally by its mechanical obstruction, or by pressing upon or causing œdema of the larynx, the enlarged organ seriously impedes respiration, and may even threaten asphyxia. There is much salivation, and the breath is very disagreeable. The glands and tissues around are usually inflamed, and the face may appear tumid and congested, from pressure on the jugular veins.

The general symptoms are usually severe, there being much inflammatory fever, with marked restlessness. Nutrition becomes greatly impaired, and there may be signs of imperfect aëration of blood.

DIAGNOSIS.—The appearances presented by the tongue, and the accompanying symptoms, are sufficiently characteristic of glossitis.

PROGNOSIS.—Glossitis is at all times a serious affection, but especially when it results from severe local irritation. It may lead to speedy suffocation. The existence of abscesses makes the prognosis worse.

TREATMENT.—The first thing to be done is to neutralize any irritating cause, if possible, as for instance the sting of a wasp, which should be immediately touched with solution of ammonia. For severe glossitis, the best treatment seems to be to make free and deep incisions along its upper surface. In milder cases leeches about the angle of the jaw are recommended. Ice should be constantly given to suck, and the parts kept moist. Saline aperients may be administered, if required. Ammonia and stimulants are often of great service. As food cannot be taken in many cases, it may be necessary to administer nutrient enemata regularly. If asphyxia is threatened, it is sometimes requisite to perform laryngotomy or tracheotomy. Incisions must be made when there are signs of abscesses having formed.

CHRONIC GLOSSITIS is occasionally met with, either as a sequel of the acute form; or as the result of some chronic irritation. It may affect the entire tongue, but is usually partial, the organ presenting indurated fibrous patches, especially on its margins. A peculiar form is described under the term *glossitis dissecans*, in which the tongue presents deep furrows upon its surface, which tend to ulcerate.

As regards treatment, pressure, ligature of the lingual arteries, or excision, may be necessary.

III. ULCERS OF THE MOUTH AND TONGUE.

In addition to the forms of ulceration already considered, the following may occur:—1. Herpetic ulcers, due to an eruption of herpes in the mouth. 2. Variolous ulcers, resulting from small-pox pustules. 3. Syphilitic ulcerations. These are very frequent on the tongue. 4. Scorbutic, chiefly seen about the gums. 5. Cancerous. 6. Ulcers due to local irritation. These are also common on the tongue, beginning often as small vesicles about the tip and sides. They are generally due to irritation by the teeth, and may become very hard, so as to simulate syphilitic ulcers.

TREATMENT.—This consists:—1. In the removal of all sources of local irritation. 2. In attending to the constitutional condition. 3. In the use of local washes and direct applications, disinfectant, astringent, or demulcent, according to circumstances. The application of nitrate of silver is often most useful. Chlorate of potash is also very valuable.

IV. SYMPTOMATIC PAROTITIS—PAROTID BUBO.

ETIOLOGY.—The form of parotitis characteristic of mumps has already been described, but a brief account is required of a variety which is liable to attend certain acute diseases as a complication or sequela. It is frequent during severe epidemics of typhus fever, but may be met with also in connection with small-pox, measles, scarlatina, cholera, pneumonia, and other complaints. Sometimes it arises by direct extension, as when it follows erysipelas of the face.

ANATOMICAL CHARACTERS.—Symptomatic parotitis differs from the idiopathic form in its great tendency to end in suppuration, though this is not invariable, for resolution may take place. After a period of congestion and tumefaction a substance collects in the ducts, which soon changes into pus. The lobules break down in the centre, and either form a number of distinct abscesses, or run into one large accumulation of matter, the cellular tissue which separates them being destroyed. The parts around may be extensively involved, cellular tissue, muscles, periosteum, and bones, and the inflammation may even extend to the cerebral meninges or the brain itself, as well as to the ear. Thrombi may form in neighbouring veins, leading to embolism and septicæmia. Gangrene sometimes occurs.

Symptoms.—These are usually by no means marked at the commencement, and the inflammation often advances very insidiously. When it ends in suppuration the skin becomes red, and prominent fluctuating points appear. If the pus is not evacuated externally, it may be discharged into the external meatus, pharynx, or mouth, or may find its way to the lower part of the neck or even into the thorax. The general symptoms are usually of a low adynamic type.

Treatment.—The local treatment should consist of frequent poulticing and the use of fomentations; as soon as signs of suppuration appear proper incisions should be at once made. Internally stimulants and tonics are generally required.

V. Chronic Enlargement of the Parotid.

Occasionally the parotid is chronically enlarged, as the result of previous inflammation, or from the growth of cancerous or other forms of tumour. This may give rise to marked pressure-symptoms. It usually needs surgical interference.

VI. Salivation or Ptyalism.

Increased flow of saliva is a frequent and troublesome symptom, brought on by a variety of causes. In some cases it is not actually formed in excess, but is allowed to flow from the mouth instead of being swallowed, so that it appears to be abnormal in quantity. The amount discharged varies greatly, but it may be exceedingly large, either continually running from the mouth, or causing a person to be perpetually spitting or swallowing, or to saturate several handkerchiefs daily. The fluid is not quite identical with healthy saliva, and may be mixed with various morbid materials. It contains some mucus, with numerous epithelium cells. Its reaction is alkaline, and it yields a good proportion of fat, but little or no ptyalin or sulphocyanide of potassium after a time. Albumen is sometimes present. Digestion is generally impaired, and considerable emaciation may be produced. Sometimes the fluid is ejected from the stomach in considerable quantity.

Etiology.—1. More or less salivation accompanies the various sources of irritation about the mouth already considered, such as stomatitis or ulcers; and is also produced by irritating substances taken into the mouth. These act by causing reflex excitation. 2. Reflex irritation through other nerves often causes ptyalism. Thus

be associated with throat inflammations, many diseases of the
h and pancreas, or worms in the intestines; in pregnancy it
ry common symptom. 3. In certain nervous diseases saliva-
not uncommon, as in various forms of insanity, hydrophobia,
a, paralysis, and neuralgia of the face. In some of these
ns it is produced in a reflex manner; in others by some
influence from the brain. 4. Certain metallic and vegetable
ıces, when taken for some time, induce ptyalism, by causing
rritation, and also directly influencing secretion. Of these
st important is mercury, but iodine and other substances
mes act in this way. 5. Critical salivation attends some
f fever, but is not always associated with a crisis. 6. Infants
l people are liable to an excessive flow of saliva. In the
it is often associated with dentition. In both there is fre-
no excess formed, but it is allowed to escape from the mouth
of being swallowed. 7. Idiopathic salivation is that form
occurs without any obvious cause.
TMENT.—1. The cause must be sought out, and if possible
d. In many cases this is all that is required. 2. Local
ent mouth-washes are useful, such as solution of alum,
acid, oak-bark, or weak mineral acids; or alum may be
3. Opium is recommended as a valuable internal remedy
nate cases.

CHAPTER II.

DISEASES OF THE THROAT.

CHARACTERS.—Throat complaints are of very common occurrence, and
ndicated by the following clinical phenomena:—
presence of soreness, pain, or other abnormal sensations. These vary
both in degree and kind; but among the most common are a sense of
burning, tightness, or as if a foreign body were present, which induces a
desire to hawk or swallow. There may also be external tenderness. 2.
s of deglutition. This act may be painful or difficult, or even quite im-
and sometimes substances tend to pass in wrong directions, such as into
ıx or posterior nares. The physical conditions of the materials which are
vallowed—such as whether solid or liquid, hot or cold,—often influence
ee of dysphagia. 3. Alteration of the voice, which is either somewhat
r husky, or even completely altered in its quality, becoming thick and
The act of speaking may cause pain. 4. Cough. This is a very common
blesome symptom attending throat-affections, especially those of a chronic
Even in pulmonary affections, especially phthisis, the state of the throat
creases this symptom considerably, and the same is true of the so-called
h-cough" accompanying dyspepsia. Frequently it is attended with the
e of much mucus. 5. Disturbance of breathing. There is not as a rule
culty of breathing in mere throat-affections, but in certain cases consider-
pnœa may be felt, especially on lying down, and patients often breathe
mouth wide open and snore loudly. 6. Foulness of the breath. 7. Deaf-
asionally, due to obstruction about the opening of the Eustachian tube.
eful examination of the whole of the fauces is requisite, whenever symp-
nt to this part as being the seat of mischief. A good light is needed, and
etimes useful to *employ artificial light* by means of the reflector of the

laryngoscope. The tongue must be kept down by a depressor or by the finger. In some cases it is also desirable to use the finger for the purpose of feeling. By this examination a knowledge is gained:—*a*, of the appearance of the general surface as regards colour, degree of moisture, &c.; *b*, of the presence of any deposit or accumulation of secretion; *c*, of the general form and dimensions of the pharynx and its openings, as well as of the size, shape, and other characters of the soft palate and its arches, the uvula, and tonsils; *d*, of the existence of any enlarged follicles, abscesses, ulcers, vesicular or other eruptions, gangrene, old cicatrizations, polypi, cancerous or other tumours. At the same time the external structures of the neck should be examined, particularly those about the angles of the jaw. It will be well also to notice the state of the mouth and lips.

I. Acute Inflammatory Affections of the Throat.

The throat is the seat of acute inflammation of a special character in diphtheria and scarlatina; thrush may also extend from the mouth to this part; or it may be inflamed in connection with eruptions on the mucous surface, especially herpetic and variolous; or from the extension of erysipelas from the face. At present, however, attention will be confined to local inflammatory affections, which are of considerable importance.

Etiology.—*Predisposing causes.*—Throat inflammations may occur at any age, but are most common on the whole in adults, probably because they are more exposed to the exciting causes. Tonsillitis is chiefly met with among young persons. Former attacks seem to increase the liability to throat inflammations, many individuals suffering constantly, or being liable to periodic attacks. Anything that lowers the health is stated to be a predisposing cause of sore throat, and certainly this is true with regard to living in a hospital for some time. Persons who are constitutionally weak appear to suffer with unusual frequency, and syphilitic individuals are decidedly more liable than others. Intemperance is said to predispose. Tonsillitis appears sometimes to run in families. Most cases occur during spring and autumn.

Exciting causes.—1. Inflammatory throat affections are generally the result of "taking cold" in some way or other, especially from exposure to cold and wet, to sudden changes of temperature, or to damp cold winds. In many cases the complaint seems to be but a part of a general catarrh from this cause. 2. Occasionally the milder forms of sore-throat appear to be due to some derangement of the alimentary canal; follicular pharyngitis is often associated with stomach-disorders. 3. Local irritants excite more or less inflammation, which may then be very serious, as from swallowing hot water or chemical irritants. 4. Certain forms of throat inflammation may perhaps be due to some poison in the atmosphere acting on the system. Some cases of hospital sore-throat seem to arise in this way. 5. Pharyngeal catarrh often accompanies the exanthemata. 6. Excessive use of the voice is liable to cause sore-throat, especially the follicular variety, which is a part "of clergyman's sore-throat."

Symptoms.—Cases of acute inflammation affecting the different structures of the throat may be conveniently arranged under the following groups.

1. Acute Pharyngeal Catarrh — Catarrhal Pharyngitis — Relaxed Sore-throat—Cynanche Pharyngea—Angina Simplex.—A large proportion of sore-throats may be included in this general group, which are due to catarrhal inflammation of the fauces and pharynx, differing much in its extent and severity in different cases. Occasionally the inflammation is of a severe character and extends more or less deeply. Uneasiness, soreness, or pain is experienced in the throat, according to the degree of inflammation, often accompanied with a sense of heat and dryness. Swallowing is always attended with discomfort, and is often painful, though the patient may be constantly inclined to perform the act, owing to a feeling as if there were something in the throat, especially if the uvula is involved. There is also a frequent tendency to cough and hawk, in order to remove the secretion formed. The voice is often thick or husky, and the act of speaking may cause pain, but there is no dyspnœa. The symptoms are generally worse during the night and after sleep. Occasionally deafness is complained of, the Eustachian tube being blocked up.

Examination reveals more or less general redness, which is usually bright, but may tend to lividity. The surface appears dry and glistening. Considerable submucous œdema may be observed where the tissue is loose, giving rise to swelling and a watery translucent appearance, particularly in connection with the uvula. A deposit of secretion often forms in patches and points over the back of the fauces and on the tonsils; these sometimes look remarkably like diphtheritic patches, but they are easily detached without causing bleeding or excoriation. Not uncommonly superficial erosion is produced, and the more intense degrees of inflammation are liable to terminate in ulceration or more or less deep suppuration; the latter may constitute a pharyngeal abscess.

In slight cases there are no general symptoms. The more severe forms may be ushered in with chilliness, headache, and pains in the limbs, and attended with pyrexia. The pulse may rise to 100 or 120, and the temperature to 102° or even higher. A bright blush occasionally suffuses the face and upper part of the body, where there is no reason to suspect scarlatina. In two cases I have met with albuminuria, which entirely disappeared after a time.

Sore-throat may come on very rapidly and attain considerable severity in a few hours, particularly a form of hospital sore-throat, which appears to be of an erysipelatous nature. This generally sets in during the night, and by the morning the symptoms are very prominent. There is much œdema and swelling, but no particular redness, deglutition being very uncomfortable and difficult.

2. Acute Follicular Pharyngitis.—This variety is characterised by the follicles of the throat being chiefly attacked, which become enlarged, hard, and red. It is attended with a good deal of soreness or pain, and abundant secretion forms, causing continous hawking. Sometimes the follicles suppurate and ulcerate.

3. Acute Tonsillitis—Amygdalitis—Cynanche Tonsillaris—Quinsy.—This affection consists in a parenchymatous inflammation of one or both tonsils. Usually there is some general febrile disturbance before throat-symptoms arise. These are soon manifested, however, and they may appear simultaneously with the fever. At first uneasiness is felt over one or both tonsils, which soon increases to considerable pain of a dull, aching character, with much tenderness. The throat feels dry, and there is a most uncomfortable sensation as if a foreign body were present. External tenderness is experienced behind the angles of the jaw, which may be considerable. Deglutition is difficult and causes much distress, the pain during the act often shooting towards the ear, while in severe cases fluids may return through the nose. After a time a quantity of sticky mucus forms, entailing frequent efforts to swallow or hawk. The voice is characteristically altered, having a thick, muffled, guttural, or nasal character, which cannot be mistaken when once heard; occasionally it is altogether lost. Breathing is not interfered with as a rule, but if both tonsils are greatly enlarged dyspnœa may be felt, especially on lying down. The patient snores loudly during sleep, and on waking the symptoms are always worse. The breath is very unpleasant. Salivation may be present. Deafness and noises in the ears are often complained of.

Examination of the throat is not always easy in tonsillitis, but if it can be effected the appearances observed are—general redness of the fauces, but more particularly of one or both tonsils; enlargement of these, sometimes so great as to cause them to meet in the middle line and almost completely to block up the passage, while they look like balls of flesh, and may actually ulcerate from mutual pressure; white or yellowish opaque spots or patches on the surface, being the products of secretion from the follicles. The palate and uvula are also swollen and œdematous, the latter being almost always observed to adhere to one of the tonsils. When the parts cannot be inspected, the finger must be made use of in order to feel the tonsils, and this is especially required in children, or in the later stages of the complaint to ascertain whether suppuration is taking place. Very often the salivary glands are swollen, and also the structures about the neck, especially the lymphatic glands, which are hard and tender, a good deal of stiffness and uneasiness being likewise experienced.

Tonsillitis is usually attended with considerable fever, and the patient feels decidedly ill, being often much prostrated. The temperature frequently rises to 102° or more, and may reach 104°; the pulse ranging from 100 to 120. There is often severe headache with much restlessness, and occasionally slight delirium at night. The tongue is covered with a thick creamy fur; appetite is lost, but there is much thirst; and the bowels are constipated. A red rash on the skin is now and then observed. The urine is markedly febrile, while chlorides are deficient or sometimes almost entirely absent.

Cases of tonsillitis vary greatly in their severity. Frequently only one tonsil is involved, but in many cases both are attacked, generally in succession, but occasionally simultaneously. The inflammation usually attains its height in five or six days, and the entire duration of most cases of tonsillitis is under ten days. Pathologically the disease may terminate in :—*a*. Resolution, the symptoms gradually subsiding. *b*. Suppuration. This is very common, being indicated by the pain becoming more pulsating or throbbing, and shooting towards the ear; rigors; and the tonsil feeling soft and fluctuating, or the colour of the pus may actually be evident through the redness. The abscess often bursts suddenly, either spontaneously or from some mechanical irritation, or it is opened, and this is followed by rapid improvement. Only one tonsil suppurates as a rule. *c*. Gangrene, of very rare occurrence, and only met with in those who are low and debilitated. *d*. Chronic enlargement, with a granular or irregular appearance, especially after repeated attacks ending in suppuration, and in weak individuals. Clinically cases of tonsillitis almost invariably terminate in recovery. Death is an exceedingly rare event, but may result from hæmorrhage or extension of inflammation to the larynx.

DIAGNOSIS. The fact of the existence of an acute inflammation of the throat is usually readily recognised, and a proper examination will generally reveal its nature. A difficulty may, however, be experienced in determining whether the complaint is local, or merely a part of some general disease, especially diphtheria or scarlatina. A careful enquiry with regard to the etiology of the case; its mode of invasion; the other symptoms present; with the degree of pyrexia, ought generally to clear up any doubt. Sometimes it is requisite to wait for a short time before giving a definite opinion; and it must be remembered that sore-throat may be almost the only symptom of scarlatina.

From laryngeal inflammations, those involving the throat are distinguished by the absence or slight degree of dyspnœa as a rule, or its different character when present; by deglutition being more interfered with; by the voice being less altered or affected in a different way; by cough being a much less marked symptom and not having laryngeal characters; and, above all, by the results of examination. It must be remembered that the inflammation may spread to the larynx; or the parts may be involved together, each then giving rise to its own special symptoms.

PROGNOSIS.—Local throat-inflammations are rarely dangerous, but they may become so by leading to much œdema of the tissues, or by spreading to the larynx, being thus liable to cause suffocation. Death from hæmorrhage has in rare instances occurred in connection with suppuration in the tonsil. It is often difficult to get rid of the liability to attacks of sore-throat.

TREATMENT.—In slight cases of sore-throat the application of a wet rag round the throat at night, covered with a piece of flannel, is all that is necessary. Even when the affection threatens to be severe, it may probably be checked not unfrequently by the assiduous application of cold water outside the throat, and the frequent sucking of ice.

In many cases, however, of acute inflammation about the throat, more definite treatment is required, and there are certain general rules which should always be carried out. The patient should be kept quiet, in a comfortably warm room, and not allowed to talk. A saline aperient may be given at the outset, and the bowels should be kept well-opened. If there is pyrexia, and the patient is not very weak, it is useful to administer saline medicines for two or three days. It is not desirable to keep the patient low, therefore a good quantity of beef-tea, milk, and other liquid nutritious food should be ordered, in moderate quantities, at frequent and regular intervals. Mucilaginous drinks afford relief, and the frequent sucking of ice is very grateful as well as beneficial Stimulants are often indicated, good port-wine being the best, this being particularly useful during convalescence, and in cases of tonsillitis; in the latter complaint from four to eight ounces may be given during the twenty-four hours.

It is affirmed that by the employment of certain drugs acute inflammatory affections of the throat can be very readily subdued, and their progress stopped. Dr. Ringer and others advocate the use of tincture of aconite in small doses frequently repeated. Guaiacum has also been supposed to exert a specific influence upon tonsillitis; and an emetic of ipecacuanha with tartar emetic at the outset has been considered efficacious in checking its course, but this is more than doubtful.

The remedies which I have found of most service are quinine (gr. i—iij); tincture of iron (♏xv—xxx); or dilute nitric acid with decoction of bark. Either of these may be given at intervals of every three or four hours, or three times a day, according to the severity of the case, and they are often beneficial from the very commencement. Quinine and iron may in many cases be combined with advantage. A mixture containing dilute hydrochloric acid and chlorate of potash has been much commended in acute catarrh of the throat. It is often desirable to order some saline drink along with the tonics, such as a solution of citrate of potash, so as to maintain a free action on the part of the skin and kidneys. In cases of tonsillitis it is not unfrequently requisite to administer some narcotic at night, such as Dover's powder or hydrate of chloral, but sleep should not be too prolonged. The patient should rest with the head high.

Local treatment is always most important. In the various forms of pharyngeal catarrh steam-inhalations, tepid milk and water gargles, with poultices and fomentations over the front of the neck, give most relief at first. Afterwards astringent gargles are useful, such as one containing alum, tannin, dilute mineral acids, or port wine. It may be desirable to apply nitrate of silver or its solution, especially in the follicular variety. If there is dangerous œdema, it is necessary to scarify the surface; and should suppuration occur, the pus must be let out by incision.

For hospital sore-throat the treatment which I have found always rapidly effective is to persevere in steam-inhalation, in frequent gargling, and in the external application of heat and moisture; and to take large quantities of beef-tea, a glass of port wine every

e or four hours, and quinine in two or three grain doses every
hours.
acute tonsillitis the best local treatment consists in the con-
ous application of heat and moisture to the throat, by means of
m-inhalations, and gargles of luke-warm water or milk and water,
hich a little Condy's fluid may often be added with advantage,
rder to diminish the unpleasant taste and odour of the breath.
he same time very hot and well-made linseed-meal poultices
uld be applied round the front of the neck, and changed at fre-
nt intervals; or spongiopiline wrung out of hot water answers
y well. When these are removed the part should be well foment-
These measures tend to subdue the inflammation if resolution
oing to happen; or they will hasten the process of suppuration.
ien indications appear that pus has formed, it is desirable to let
out and thus give immediate relief; or it may be requisite to
icture the tonsils even though there is no distinct evidence of the
sence of pus, should breathing be greatly impeded. Some
vocate the use of irritating applications to the neck externally,
h as sinapisms, liniments, and blisters, but to me these appear
cidedly objectionable. Possibly, if there are very severe local
mptoms, attended with great swelling, it might be advisable to
ply two or three leeches behind the angle of the jaw.
During convalescence after tonsillitis tonics are needed for some
ne, with good nourishing food and wine. A change of air often
es much good. Locally astringent gargles or other applications
e necessary, the most serviceable being glycerine of tannin,
icture of steel with glycerine, or nitrate of silver solution.
iould the tonsils remain permanently very large, it may be re-
isite to excise them.
As prophylactic measures in those who are subject to sore-throat
quinsy, frequent cold douching of the throat externally, and the
aily use of cold water or mild astringent gargles should be re-
mmended. The general health must be attended to, and all
ijurious habits checked. A change of air and a course of tonic
iedicines frequently lead to good results.

II. Ulcerations of the Throat.

Ulcers are very common in connection with the various structures
f the throat, being either acute or chronic. They may be enu-
ierated as:—1. Catarrhal, which are slight and superficial, being
ery frequently observed, especially at the back of the pharynx,
nd often associated with chronic catarrh. 2. Follicular. These
re generally small, circular or oval, corresponding to the follicles,
ut may by their union become irregular and of some size. 3.
yphilitic, either secondary or tertiary. 4. Scarlatinal. 5. Diph-
ieritic. 6. Ulcers following eruptions, such as herpes. 7. Gan-
renous ulceration or sloughing sore-throat—*Cynanche* or *angina*
aligna. This form of ulceration is generally associated with
yphilis or scarlatina, but may be independent of these affections.

Thus it may follow severe catarrhal inflammation, if the patient is in a very low state of health from any cause; and occasionally it occurs as a complication of typhus, enteric fever, or other exanthemata. It spreads more or less extensively, but not as a rule deeply, and the mucous membrane is dusky, while there is much œdema around 8. Ulcers on the tonsils, simulating syphilitic ulcers, but probably originating in blocking-up and inflammation of their follicles. 9. Cancerous ulceration, which is extremely rare.

SYMPTOMS.—Ulceration of the throat may be unattended with any symptoms, even when of considerable extent. Usually, however, local symptoms are present to a greater or less degree. There may be merely uneasiness or pain and difficulty in swallowing, but when certain parts are destroyed most unpleasant and dangerous symptoms are liable to arise. Food, especially of a liquid kind, may tend to pass into the posterior nares or down the larynx instead of into the œsophagus. The voice is often completely altered, being thick, guttural, and indistinct, or the patient may scarcely be able to articulate at all. Offensive matters are hawked or coughed up, and the breath is in many cases very foul. It is important to notice that dyspnœa is not uncommonly present, with very noisy breathing, and that there may be a liability to sudden death from suffocation, in consequence of the ulceration involving the upper opening of the larynx.

Ulceration of the throat is often attended with a low condition of health, and there may be much emaciation and debility, owing to inability to swallow food. In gangrenous ulceration there is a danger of septicæmic symptoms setting in.

The consequences of ulceration are also frequently very unpleasant, in the way of permanent destruction of tissues, adhesions, contractions, &c. I have seen a case in which the throat was one large chasm, with thickened bands extending along its walls, every trace of its various parts having been removed. Of course under these circumstances swallowing is very difficult, and the voice is permanently altered.

DIAGNOSIS.—The fact that the throat may be ulcerated without any complaint of local symptoms being made by the patient should be borne in mind. The smell of the breath has in not a few instances led me to the discovery of unsuspected ulceration, and when this is fœtid, the throat should always be carefully examined. In conducting the examination, it is necessary to raise the uvula in order to see the upper part of the back of the pharynx, as ulcers are not uncommon here, and may otherwise be overlooked. It is important to determine the nature of any ulceration of the throat, especially if it should be of syphilitic character.

PROGNOSIS.—Ulceration of the throat may prove immediately dangerous, in consequence of spreading to the larynx, giving rise to hæmorrhage, or inducing septicæmia. Some forms are difficult to cure. The destructive effects of ulceration may lead to serious permanent mischief.

TREATMENT.—*Local.* For most ulcerations of the throat nothing answers better than the frequent use of chlorate of potash as a

-iij to Oj); or in the form of lozenges or spray. Fol-
and others of a chronic nature often require to be
l with nitrate of silver or its solution. When the sur-
y, antiseptic gargles must be abundantly employed,
containing Condy's fluid, carbolic acid, creosote, or
they may be used alternately with the chlorate of
:. In gangrenous forms of ulceration shewing a ten-
:ad, it is advisable to start by brushing the surface
y with strong nitric or hydrochloric acid, then pro-
the other applications. Inhalations containing car-
:osote, or other antiseptics are also very valuable.
t is very important at the outset to determine the
throat-ulceration, and especially whether it is due to
uch is the case, iodide of potassium with decoction of
rk or quinine generally produces the best results.
mercurial course is required, but it must be conducted
It will often be found, even in syphilitic cases where
h sloughing, that dilute nitric acid with decoction of
about rapid improvement, and this mixture is very
r forms of gangrenous ulceration. Tincture of steel
inim doses every four or six hours is also exceedingly
ecially if there is much debility, and it may be com-
uinine. The internal administration of chlorate of
ommended as a specific remedy in throat ulcerations.
ed to me to answer just as well if freely employed
t may be given as a drink. Dr. Sansom advocates
sulpho-carbolates. Not uncommonly one of the most
atters to attend to is the feeding of the patient. In
owing to difficulty or pain in swallowing, very little
ment is taken, and hence the system becomes greatly
healthy action cannot take place. Under these cir-
he patient must be compelled to take small quantities
and milk at frequent intervals, and in this way a
amount of nutriment may be administered. If this is
n for a short time, the patient generally becomes able
asily, and there is a marked effect for good produced
tion. At the same time a good quantity of port wine
iven in similar small doses. If deglutition is really
utrient enemata must be employed.
e is much dyspnœa accompanying throat ulceration
watching is needed, as remarkably sudden death may
uffocation, and laryngotomy or tracheotomy may be
a moment's notice. Indeed in some of these cases it
advisable to open the larynx as a precautionary mea-
prevent any danger of sudden death, and at the same
the ulcerated parts in a state of rest, and therefore
ourable condition for undergoing the healing process.

III. CHRONIC AFFECTIONS OF THE THROAT.

1. CHRONIC PHARYNGEAL CATARRH.—This is a very common condition, the symptoms being uneasiness or soreness of the throat, increased by irritating substances; roughness or huskiness of the voice; a frequent desire to clear the throat; cough, especially in the mornings, there being much difficulty in removing the secretion which forms. Examination reveals redness, frequently with permanent enlargement of the vessels; a rough, granular appearance (granular sore-throat); or numerous enlarged follicles (follicular sore-throat); or raised hard papules of a considerable size; generally much thick sticky secretion; and superficial erosions or ulcerations, or follicular ulcers. Chronic pharyngeal catarrh is often associated with disorders of the stomach; phthisis; chronic alcoholism; excessive smoking; too much talking or singing; or a relaxed uvula.

2. RELAXED MUCOUS MEMBRANE is frequently the cause of unpleasant throat symptoms, and it either follows catarrh, or is associated with general debility. A quantity of secretion forms on the surface, giving rise to cough. A relaxed and elongated uvula induces very uncomfortable sensations, with a tickling cough, which comes on particularly when the patient lies down at night, owing to the uvula falling back and causing irritation. It may excite nausea and vomiting.

3. CHRONIC ENLARGEMENT OF THE TONSILS.—Enlargement of the tonsils beginning during very early life is liable to lead to serious results, and therefore, when examining children it is always desirable to ascertain the condition of their tonsils, especially if they are rickety, tubercular, or strumous. Its pathological causes are:—1. Chronic inflammation, either following acute tonsillitis, especially after several attacks, or coming on gradually. 2. Persistent or frequently-repeated congestion. 3. Albuminoid infiltration.

The chief symptoms are difficulty of deglutition and alteration of voice. Breathing is not uncommonly interfered with, and the report frequently is "that the child makes a great noise when asleep," snoring loudly. In course of time deformity of the chest may result from the obstruction to the entrance of air. Deafness is not an unusual symptom. On inspection the tonsils are seen to be more or less enlarged, and they may meet in the middle line. There is no particular redness, but the surface appears granular or irregular, and white opaque accumulations of secretion are often observed upon it. The tonsils feel hard. The general health is in most cases below par, and nutrition is interfered with, so that growth and development do not proceed properly. Tonsils chronically enlarged may be liable to acute exacerbations from time to time.

4. Polypi and various growths, benign or malignant, are in rare instances met with in the throat. They cause more or less obstruction, and their nature is revealed on examination.

DIAGNOSIS.—All that need be said here is that chronic affections of the throat may be simulated in nervous people when there is nothing really wrong; and that symptoms attributed to other diseases are not uncommonly due to some abnormal condition of this part which has been overlooked. This remark applies particularly to cough. The habitual examination of the throat will guard against this error.

PROGNOSIS.—Chronic throat complaints are not often dangerous in themselves, but they frequently cause much annoyance, and may be very difficult to get rid of.

TREATMENT.—In treating any chronic throat affection, it is requisite first of all to find out its cause, and remove this, if possible. Intemperance in drink; excessive smoking; the habitual use of hot spices and condiments in excess; or too much speaking in public or singing, must be put a stop to. At the same time it is often important to improve the general health by careful attention to hygiene and diet, especially in the case of children suffering from enlarged tonsils, for whom a change to the seaside is very beneficial. If the alimentary canal is out of order it must be attended to. The internal administration of quinine and iron; acids with bitter infusions; or nux vomica or strychnia, frequently does much good. Steel wine and cod-liver oil are very useful in cases of enlarged tonsils.

Local treatment is essential. The regular and efficient employment of astringent applications is generally called for, in the form of gargles, glycerines or solutions applied with a brush, spray, lozenges, or powders. The most serviceable topical remedies are alum, tannin, dilute mineral acids, tincture of capsicum, catechu, tincture of steel, sulphate of zinc, or nitrate of silver. Infusion of roses with dilute sulphuric acid and tincture of capsicum constitutes an agreeable and useful gargle. Glycerine of tannin is a very efficient application in many chronic conditions of the throat. It may be necessary to puncture follicles, and then touch them with nitrate of silver; or to snip off an elongated uvula. When the tonsils are enlarged, the regular application of strong glycerine of tannin, nitrate of silver, or tincture of iodine may be tried, but generally these are quite ineffectual, and the tonsils have to be excised. After excision, it is necessary to see that they heal properly, as they are apt to remain in a painful state for some time. If the chest is becoming deformed, there should be no delay in removing the tonsils. Growths may need excision.

IV. RETRO-PHARYNGEAL ABSCESS.

This is a very rare affection, which may be either acute or chronic, and occurs under the following circumstances:—1. As a complication or sequela of the acute specific fevers. 2. In pyæmia. 3. As the result of local injury or disease, *e.g.*, caries of the cervical vertebræ, or disease of the laryngeal cartilages. 4. Extremely rarely as the termination of a primary inflammation.

SYMPTOMS.—These are pain at the back of the pharynx; much difficulty in swallowing, food and drink returning by the nose; alteration in the voice; cough; and often great dyspnœa, with a sense of suffocation. The abscess may be seen or felt in the pharynx, or it may form an external enlargement, and after a time fluctuation can be detected in most instances.

Treatment.—This consists in at once letting out the pus by careful incision; and keeping up the patient by nutritious diet, stimulants, and tonics.

Chapter III.

DISEASES OF THE ŒSOPHAGUS.

Clinical Characters.—The clinical phenomena which are to be looked for as indicative of œsophageal affections are:—1. The existence of pain, which generally seems to lie deep in the chest, as if between the shoulders, and fixed in some particular spot; or of other abnormal sensations, such as fulness, tightness, oppression, burning, or obstruction by a foreign body. 2. Pain or difficulty during deglutition. When this symptom is noticed inquiry must be made with regard to its degree; whether the difficulty can be overcome by repeated efforts; if it can be localised in any particular spot; whether it has come on gradually and steadily increased or suddenly, and if it is constant or only paroxysmal, associated or not with the taking of food; if it is influenced by the liquid or solid character of things swallowed, the size of solids, hot or cold substances, or special articles of diet; whether the act is aided by any particular position. 3. Rejection of various substances, such as food, mucus, blood, exudation, pus, &c., either by mere regurgitation, spasmodic action, or vomiting. This may occur immediately after taking food, or after an interval, a large quantity being then discharged, as if the materials had been accumulating for some time. Food which has remained in the œsophagus instead of entering the stomach has an alkaline reaction, and is macerated and decomposed instead of having undergone the digestive process.

4. *Physical examination* often aids materially in the investigation of œsophageal affections. This includes:—*a.* A full inspection of the throat. *b.* The passage of an œsophageal bougie, which must be done cautiously. By the use of this instrument important information may be obtained. (i.) It enables the practitioner to ascertain if there is any actual obstruction, as well as its seat and degree; also whether this is constant and increasing, or only present from time to time, and if it can be overcome by continuous moderate pressure, yielding more or less suddenly. (ii.) Should there be obstruction, the actual shape of the obstructed part may be known by making the bougie warm and soft, and thus getting a mould of the passage. (iii.) Frequently the bougie brings up materials on its surface, such as blood, pus, cancer-cells, &c., which should then be examined microscopically. (iv.) Occasionally the bougie may be felt to pass round something, such as a polypus. *c.* Auscultation. This is sometimes useful, for when the stethoscope is applied in the course of the œsophagus behind, and the patient made to swallow, a sound may be produced, should any obstruction be present, as if something were passing through a narrowed portion into a wider part beyond. Dr. Clifford Allbutt has recently drawn special attention to the value of œsophageal auscultation. *d.* External examination:—(i.) For any swelling in the neck or elsewhere in the course of the gullet, which might indicate dilatation or sacculation of this tube; at the same time noticing whether any such enlargement is influenced by taking food or drink, or by the act of vomiting or retching. (ii.) For any tumour in the neck or chest likely to influence the functions of the œsophagus by pressure.

I. Acute Œsophagitis.

Etiology.—Œsophagitis may arise:—1. As a simple catarrhal inflammation, along with catarrh of other mucous membranes. 2. From direct injury by foreign bodies. 3. From irritation or corrosion by chemical substances, such as acids, alkalis, corrosive sublimate; also by very hot or cold articles. 4. By extension of thrush or diphtheria, when the characteristic deposits are met with. 5. As a complication of

cific fevers, cholera, pyæmia, and other acute affections. 6. In
tion with organic disease, as ulcer or stricture.

ROMICAL CHARACTERS.—There are the usual signs of inflamma-
z., redness and swelling of the mucous membrane, with loss of
:nce, and various deposits on the surface, according to the nature
inflammation. Occasionally ulceration is seen, and superficial
s are common; if the inflammation is caused by corrosives there
much destruction of tissue. As a rare event pus forms beneath
cous membrane.

TOMS.—More or less pain is felt deep in the chest, along the
of the œsophagus, which may extend to the epigastrium. If
ulceration, the pain is very severe at this spot. Deglutition is
and painful, food and drink being ejected either immediately by
or subsequently by vomiting, along with much mucus or some-
ith blood, pus, membranous shreds, or casts. In severe cases
ay be great distress, with a marked sense of oppression about
it. The general symptoms are of a febrile character, and there
thirst. Should the œsophagus be corroded or ulcerated, perfo-
nay possibly take place, indicated by its special symptoms.

TMENT.—In mild cases no special treatment is required. In
orms of œsophagitis all that can be done is to let the patient
freely; give only liquid and mucilaginous diet in small quanti-
if there is corrosion, employ nutrient enemata, so that the œso-
nay be left entirely at rest; apply hot fomentations externally;
ninister opium to relieve pain and procure rest.

II. CHRONIC DISEASES OF THE ŒSOPHAGUS.

are of much importance, and may be described under:—
tiona derangements. B. Organic diseases.

A. FUNCTIONAL DERANGEMENTS.

RALYSIS.—This extremely rare condition is met with only in
ervous affections, viz., general paralysis of the insane; progres-
:ular atrophy; some cases of brain disease; the paralysis which
iphtheria; hysteria; or in glosso-laryngeal paralysis.

OMS.—Dysphagia is the only symptom, which is particularly
egard to liquids, these tending to pass into the larynx. Solids,
cially large pieces, are more easily swallowed, and the erect
acilitates the act of deglutition. The bougie can be passed
lily.

PHAGISMUS OR SPASM.—A slight degree of œsophageal spasm
all infrequent, and sometimes it gives rise to much distress,
:omplete obstruction.

GY.—The causes of œsophagismus are—1. Most commonly
rous condition, especially hysteria and hypochondriasis. 2.
ise very rarely. 3. Local irritation, especially that of an
Occasionally dyspepsia with flatulence. 5. External pres-
: nerves of the œsophagus. 6. Intemperance.

SYMPTOMS.—There may be a constant feeling of obstruction in fixed point, as if a foreign body were impacted, but pain is a When food is taken, sudden dysphagia comes on and a stoppage is a certain spot, either absolute and complete, or yielding after efforts have been made to swallow, this event often occurring suddenly. The attacks are not always constant, for at times degl may be effected comfortably. The act is often influenced by the and temperature of the food. Usually much discomfort is felt the attempts at swallowing, with a sense of oppression or suffo and sometimes spasmodic movements of the muscles of the n excited. On attempting to pass a bougie its progress is stopp after careful continued pressure the spasm gives way, sometim denly, and the instrument passes on. In the cases which have under my notice the upper part of the canal was affected, but th end may be involved. Dyspeptic symptoms are frequently com of, especially flatulence and eructations, which may bring on the There are no signs of wasting or of serious organic disease as but generally the patient is distinctly hysterical or hypochon Should œsophagismus be due to a tumour pressing on its ner will probably yield physical signs of its presence.

B. ORGANIC DISEASES.

1. CHRONIC ULCERATION.—An ulcer is occasionally seen œsophagus, presenting similar characters to those to be here scribed in connection with the stomach. It is liable to give cause perforation.

SYMPTOMS.—Usually much localized pain is experienced, of a character. Deglutition is very painful and difficult or impracticable on account of spasm, and this is sometimes the only symptom. and mucus may be expelled, or brought away on the bougie. care must be exercised in using this instrument if there is any re suspect ulceration.

2. STRICTURE AND OBSTRUCTION.—The conditions which ma permanent narrowing or complete closure of the passage of the may be thus enumerated :—

(i.) *Organic changes in its walls*, viz. :—*a*. Cancerous infil *b*. Cicatricial thickening and contraction after wounds, ulcers, rosion. *c*. Hypertrophy of the coats, especially the submucous tissue; or exudation and thickening as the result of chronic inf tion. *d*. Syphilitic growths. *e*. Ulceration with induration and of the margins of the ulcer.

(ii.) *External pressure* from—*a*. An enlarged thyroid gland. larged lymphatic glands in the neck or chest. *c*. Various tum growths in the neighbourhood, such as cancer, fibrous tumo ostoses; as well as aneurisms and abscesses. *d*. Great disten the pericardium by fluid.

(iii.) *Growths projecting inwards from the walls of the œsoph from outside*, these being generally cancerous, fibrous, or of the polypi.

RESULTS.—After a time the gullet becomes dilated and hypertrophied above the seat of any obstruction, and in this distended portion food is apt to accumulate, causing irritation, ulceration, and sometimes perforation. The mucous membrane is also liable to ulcerate at the point of stricture. Below this point the tube usually becomes narrowed and atrophied.

SYMPTOMS.—Dysphagia is the chief symptom of organic obstruction, and a feeling is experienced as if the food always stops at a certain spot, which in the great majority of cases lies behind the upper piece of the sternum. At first the difficulty is only slight, but it increases, usually slowly, until at last nothing whatever will pass. Liquids and soft pulpy substances are far more easily swallowed than solids, especially when these are in large pieces, hence the patients learn to chew their food thoroughly. If a good-sized lump can be got through the obstruction things will then pass more readily for a time. Food is either immediately regurgitated or spasmodically rejected; or it is retained in a dilatation for some time and then discharged in large quantities, being almost always alkaline, as well as sodden and decomposed. A good deal of mucus is brought up, and sometimes blood or pus if there is ulceration. Pain is frequently absent or very slight, but if cancer or an ulcer is present it is commonly severe. A sense of pressure and weight in the chest is often complained of. If the obstruction is seated near the lower end of the œsophagus, the symptoms may appear to be associated with the stomach.

In proportion to the difficulty experienced in taking nourishment will be the degree of emaciation and weakness, which are in many cases extreme, the abdomen becoming greatly retracted, and the patient exhibiting all the signs of starvation, at the same time being often very hungry and thirsty.

The use of the bougie gives accurate information as to the actual existence, position, degree, shape, and rate of progress of any stricture or obstruction. It may also reveal its cause by the substances it brings up. Auscultation may give some aid in diagnosis. A tumour usually gives rise to symptoms of pressure on surrounding structures; as well as to external physical signs.

3. CANCER.—It is requisite to make a few additional remarks with regard to this extremely rare disease. Males and persons of advanced years are the subjects in whom it usually occurs.

ANATOMICAL CHARACTERS.—The upper end of the œsophagus is involved in most cases, then the lower, and only very exceptionally the middle part. All forms of cancer are met with, the epithelial variety being most frequent above, and the scirrhus near the cardiac orifice; the growth may infiltrate the coats and extend through the entire circumference, or form a distinct tumour. The affected part is thickened, constricted, hard, and irregular, and ulceration of the mucous surface is liable to occur. The submucous tissue is that in which the formation is first observed. The glands in the neighbourhood are generally cancerous, but other organs are not often affected.

SYMPTOMS.—In addition to symptoms pointing to obstruction, there is much pain, generally localized, but also shooting along the side, upwards, or backwards between *the scapulæ*. The bougie may bring up cancer-cells, or these may be rejected. Signs of pressure are usually evident, especially dyspnœa. Dyspeptic symptoms, with pyrosis and eructations, are common, and may be present for some time before any local signs appear. Great wasting and debility are generally observed, with œdema of the legs; and the cancerous cachexia may be well-marked. Œsophageal cancer has almost always a short duration, the average being about thirteen months.

4. DILATATION OR POUCHING.—This condition may affect the whole circumference of the gullet; or form a hernia or sacculation on one side. It arises from—(i.) Some obstruction most commonly. (ii.) Lodgment of a foreign body. (iii.) Paralysis from chronic catarrh. (iv.) No evident cause. It may form a tumour in the neck, influenced as to its size and other characters by taking food or drink, or by vomiting. Substances collect in it, and are then discharged at variable intervals.

5. PERFORATION.—The œsophagus may be perforated from within, as the result of ulceration, cancer, corrosive destruction, or injury by a foreign body; or from without, by aortic aneurism, abscesses, glandular or other tumours. The perforation may take place into various parts, and the symptoms will vary accordingly. It is generally accompanied with signs of collapse.

GENERAL DIAGNOSIS, PROGNOSIS, AND TREATMENT OF CHRONIC ŒSOPHAGEAL DISEASES.

DIAGNOSIS.—When a case occurs in which symptoms point to the œsophagus, the diagnosis has to determine:—1. Whether this tube is organically or functionally affected; or is interfered with by some neighbouring growth. 2. The nature and origin of the disease—if organic, whether cancerous, &c.; if functional, whether of the nature of paralysis or spasm. 3. The seat of the morbid condition, as regards the part of the tube involved.

It is often very difficult to determine what the actual state of things is, and in order to arrive at a correct diagnosis the following points must be carefully taken into account:—1. The history of the patient and his family; the conditions as regards age and other circumstances; as well as the history of the complaint, with respect to its cause, previous duration, and course. 2. The general state of the patient, especially as to the degree of emaciation and debility, and the presence of any diathesis. 3. The degree, characters, and situation of the local symptoms, particular attention being paid to deglutition, from which much information may be gained. 4. The knowledge conveyed by the use of the bougie, which is often very accurate and decisive; as well as by the other modes of physical examination, especially to determine whether tumours exist in the vicinity of the œsophagus. 5. If any signs of adjacent pressure are present. 6. The state of the nervous system. 7. The condition of the stomach. 8. The progress of the case. The descriptions already given will sufficiently indicate how the different diseases differ in these respects.

PROGNOSIS.—Spasmodic affections of the œsophagus are not dangerous as a rule, but they are often exceedingly difficult to cure. Paralysis

ery serious in most cases, being a part of some grave nervous disease.
all organic diseases the diagnosis is highly unfavourable. In ulcera-
n the chief dangers are from perforation, or from stricture after healing.
ery form of obstruction involves an unfavourable prognosis, and when
ıcer exists a speedy termination may be foretold. In some conditions
ich cause obstruction the prognosis depends partly on the results of
atment.

TREATMENT.—1. The general condition of the patient must be
ended to. If a hysterical condition is evident, assafœtida, aloetics,
n, and valerianate of zinc are indicated. In the serious nervous dis-
lers strychnine and electricity are of most service, but generally no
d can be done. Proper dieting is most essential if there is any real
struction; liquid or pulpy nourishing food must be administered in
ficient quantities, and the patient should be fed at intervals through
tomach pump. At last nutrient enemata have generally to be used,
d should there be ulceration, they are decidedly indicated at an early
iod, so that the ulcer may not be irritated, and may be allowed to
l. Any special diathesis, such as syphilis, must have its appropriate
nedies. Dyspeptic symptoms frequently require attention. The
ength must be kept up by tonics, cod-liver oil, and stimulants, as
l as by food. 2. External local applications sometimes do good in
ophagismus, such as a blister over the sternum, a belladonna plaster,
friction with belladonna liniment. Probably these act through a
ntal influence. No local treatment has any effect in the other con-
ions. 3. The bougie is most valuable in treatment as well as in
gnosis. The threat of its use sometimes does good in spasmodic
es, and its regular employment often leads to much improvement.
its aid strictures can often be dilated, but great care must be exercised
erforming this operation, especially if an ulcer is present. 4. Various
nptoms, such as pain, sleeplessness, or vomiting, frequently call for
cial treatment by means of opium, morphia, or other narcotics, local
it, ice, and other remedies. 5. In some instances the advisability
erforming œsophagotomy or gastrotomy has to be considered.

CHAPTER IV.

DISEASES OF THE RESPIRATORY ORGANS.

LINICAL CHARACTERS.—The clinical phenomena associated with the respiratory
ns vary in their precise characters according to the part affected, and the nature
he disease; but the following outline may serve to indicate their main features.

. Morbid sensations are very commonly complained of. When the larynx or
hea is involved, these sensations are referred to this portion of the respiratory tract,
chief being mere uneasiness, soreness, actual pain of variable characters, a sense of
ning, irritation, or a feeling as if a foreign body were present. They are often
eased by acts causing local disturbance, such as coughing, speaking, or singing.
re may be external tenderness over the larynx, especially on making pressure
ctly backwards. In affections of the bronchi, lungs, or pleura, pain is generally
erienced over some part of the chest, with regard to which it is always important
bserve the effects of cough and deep inspiration. 2. Breathing is frequently dis-
ed in some way or other, there being some form of dyspnœa. Any obstruction

in the main air-tube causes serious interference with respiration, and hence in laryngeal and tracheal diseases breathing is frequently noisy, hissing, whistling, or stridulous; prolonged and laboured; while there may be signs of urgent dyspnœa, with indications that little or no air enters the lungs during inspiration, especially in the case of young children. In some conditions expiration is undisturbed. Laryngeal dyspnœa may be constant or only paroxysmal, sometimes coming on very suddenly, and being always liable to exacerbations. As regards other portions of the respiratory apparatus, the characters of the disorder of breathing will vary with the nature of the disease. 3. Certain acts are excited which have for their object the removal of some source of irritation in connection with the respiratory tract. The most important of these is cough, but sneezing and hawking also come under this head, the former being excited by some irritation in the nasal passages, the latter by a similar condition in the larynx or throat. Cough differs in its characters according to its cause. Laryngeal cough is peculiar and characteristic, being irritable, and liable to come on in distressing fits; difficult to repress; hard, hoarse, cracked, croupous, metallic, barking, or aphonic. In many cases of laryngeal disease there is a constant desire to cough or hawk, in order to get rid of a feeling of some obstruction. 4. The expulsive acts just alluded to are frequently attended with the discharge of various substances, technically termed *expectoration* or *sputa.* These may consist of mucus, muco-purulent matter, pus, croupous or diphtheritic exudations, portions of morbid structures or of the tissues of the air-passages or lungs, calcareous particles, or other materials. 5. Hæmoptysis or spitting of blood demands notice as a special form of expectoration, this being a symptom of considerable importance. 6. The voice is liable to more or less alteration in its characters when the larynx is implicated. It may be weak to complete aphonia; altered in quality, being rough, harsh, hoarse, croupy, or cracked; or changed in pitch or range. 7. Occasionally the expired air presents abnormal characters. 8. In diseases affecting the larynx deglutition may be somewhat uneasy or painful, and if the epiglottis is destroyed the act is difficult, things being apt to pass into the air-passages. In exceptional cases of certain lung-affections the patient may also experience some difficulty in swallowing, this being probably due to nervous disturbance. 9. The general aspect and posture of the patient often afford important indications in connection with diseases of the respiratory organs, and therefore should always receive particular attention.

PHYSICAL EXAMINATION.

Physical examination constitutes an essential and most important part of clinical investigation directed to the respiratory organs, and the subject therefore needs to be discussed as fully and completely as the limits of this work permit, though it will be impossible to enter into lengthy details.

A. EXAMINATION OF THE LARYNX AND TRACHEA.

Physical examination directed to the investigation of morbid conditions affecting the larynx or trachea includes :—

a. External examination of the neck, which, for example, may reveal the presence of any tumour interfering with the main air tube, or a fistulous communication with this part. Direct examination over the larynx and trachea, by means of palpation and auscultation more especially, may also be useful, the latter detecting any alterations in the breath-sounds, or revealing local rhonchi.

b. Examination of the throat internally. Much information is often gained by inspecting this part with a good light, there being in many cases similar morbid conditions affecting the throat and larynx. The state of the epiglottis can also be frequently made out in this manner, or it may be felt by the finger.

c. Examination of the chest, which will show whether there is any obstruction to the entrance of air into the lungs; or if there is any tumour in this region disturbing the functions of the air-tubes.

d. Examination with the laryngoscope. The laryngoscope is specially employed for determining the state of the upper part of the windpipe, and although it is possible in many instances to come to a tolerably accurate conclusion on this matter without its aid, yet by it alone can the exact conditions present be ascertained. It is also useful for the purpose of applying local remedies and performing operations. Much practice is required before the instrument can be effectually made use of.

The laryngoscope consists of an apparatus for illuminating the back of the throat; and a small mirror, which is introduced into this region in such a way as to reflect an image of the interior of the larynx. Illumination is usually effected by reflection, a mirror being attached to the observer's head in various ways, which is made to reflect either solar light, or, more commonly, that derived from some artificial source. Numerous lamps have been invented, of which one of the best is the "rack-movement lamp" of Dr. Morell-Mackenzie, but any lamp which yields a clear, strong, and steady light will suffice for ordinary purposes. Some employ direct illumination, by means of a lamp placed on a narrow table between the operator and the patient, having a powerful lens directed towards the latter, and being screened towards the former. The oxy-hydrogen light answers best in this way. The throat-mirrors are generally circular, varying in diameter from half-an-inch to an inch, but if the tonsils are enlarged, oval or ovoid mirrors may be employed. They ought to be made of glass backed with a coating of silver, mounted in German silver, and fixed at an angle of about 120° to a slender shank which is inserted into a handle.

Mode of examination. The patient sits opposite the observer, with the head inclined very slightly backwards, an interval of about a foot being left between their faces. The lamp is placed at the side of the patient, the flame being on a level with the eyes. The mouth being opened as widely as possible, and the tongue protruded, this is held gently between the thumb and forefinger of the left hand, covered with a handkerchief or a soft napkin. By means of the reflector the light is then directed to the back of the throat, so that the centre of the disc corresponds to the base of the uvula. The throat-mirror, having been properly warmed over the lamp, is now introduced, being held between the thumb and fingers of the right hand; the reflecting surface is directed more or less obliquely downwards, while the opposite one touches the base of the uvula, which should be pushed gently upwards and backwards. In order to facilitate the introduction of the mirror, it is often necessary to make the patient take a deep breath, or repeat the sound "ah." Some persons can bear examination for any length of time if it is properly conducted, but in most cases it is better to introduce the mirror several times in succession, for a few seconds each time.

It is requisite to become familiar with the appearances observed with the laryngoscope in the healthy larynx before this instrument can be made use of in investigating diseased conditions. The morbid conditions which may be detected are:—1. Changes in colour, due to congestion, inflammation, or other causes. 2. Alterations in the size, shape, and position of the epiglottis. 3. Thickening of tissues with irregularity, resulting from chronic inflammation. 4. Swelling from œdema. 5. Various deposits, especially croupous. 6. Ulcerations. 7. Growths and tumours. 8. Changes in the shape and size of different parts, particularly of the opening of the glottis. 9. Derangement of the action of the muscles of the glottis, as observed during the act of breathing or vocalization.

B. Examination of the Chest.

Physical examination of the chest includes that of its walls and of its several contents. The present section will be devoted to a consideration of the subject so far as it applies to the respiratory apparatus; other structures must, however, be alluded to more or less, but the examination of the heart and vessels will be treated of separately in a subsequent chapter.

There are some general practical hints to which it is desirable to call attention at the outset. 1. A knowledge of the anatomy and physiology of the thorax and its contents is most essential before physical examination can be applied to the investigation of any morbid condition in connection with them. It is also requisite to be familiar with the normal physical signs, it being borne in mind that these are influenced by the liver and spleen, which invade upon the limits of the chest, and hence students should first practise examining healthy individuals. 2. When investigating for disease, the chest should be exposed to the full extent that any individual case may require. It is often necessary to strip the chest and upper part of the abdomen completely, and in the case of males and children there need be no hesitation about doing this; the examination of females must of course be conducted with due regard to decency. To make a practice of examining through garments is most objectionable. 3. The patient should assume an appropriate position, the objects aimed at being to place the superficial structures under such conditions that they will not interfere with the production or perception of the physical signs; and to enable the operator to conduct the examination in a comfortable and unrestrained attitude. Ordinarily, when the front of the chest is being examined, the patient should sit or stand with the hands hanging down by the side. A slightly stooping posture, with the head bent forward and the arms well folded across the chest, so that the scapulæ are drawn away from the spine and the muscles are put on the stretch, answers best for examining the back. The sides are most conveniently reached by having the arms raised vertically above the head. 4. The investigation ought to be carried out thoroughly and completely whenever circumstances seem to require this, every part of the chest being explored. Certain regions, however, demand special attention, viz., those corresponding to the apices of the lungs, both in front and behind; to their bases posteriorly and laterally; and to the heart and great vessels. 5. It is most desirable that the examination should be conducted in a systematic and orderly manner. The different methods should be gone through in regular succession, the lungs being first attended to, and then the heart and vessels. In many cases it is advisable to complete the examination of a particular region before proceeding to another part of the chest. It must be remembered t the various structures within the thorax mutually affect each other's ysical signs, and that examination of one organ may aid in detecting e morbid condition in another. 6. Repeated examination may be eded before a satisfactory diagnosis can be arrived at. In many ute cases also the physical signs should be noted at frequent intervals, order to observe their progress; while in those affections which are own to have a tendency to implicate the thoracic organs, these must investigated as often as the nature of the case seems to require. 7. rtain conditions which influence the physical signs both in health disease must always be taken into account. These are the state of chest-walls as regards the amount of fat and muscle, and the conons of the ribs and cartilages; the form of the thorax; the part over h the examination is made; the age and sex of the individual ined; the state of the nervous system, nervousness and hysteria rially affecting the respiratory and cardiac actions; the manner in h breathing is carried on, many persons needing instruction as to to perform this act; the amount of air contained in the lungs, ding to the stage of the respiratory act as regards inspiration and ation. 8. When examining opposite sides with the view of comg them, care must be taken that the examination is made over sponding regions, and in precisely the same manner. 9. A preary acquaintance with the principles or theory of physical examinais highly desirable, but the student must remember that by continued experience alone can he become thoroughly grounded practical application of these principles. 10. Physical signs are ndications of certain physical conditions; and, therefore, in order ppreciate the significance of the signs elicited in any particular se, the abnormal physical conditions associated with such disease be clearly understood.

VISIONS OF THE THORAX.—For the purpose of describing the ion and limits of physical signs, certain imaginary lines are drawn he chest, and regions marked off, the chief of which are as rs:—

Lines. These are drawn vertically from the top to the bottom of hest, and are named according to their position:—1. Mid-sternal. ight and left lateral sternal. 3. Nipple or mammary-line. 4. Acrofrom the acromion process. 5. Mid-axillary. 6. Scapular, along ertebral border of the scapula. 7. Mid-spinal.

Regions. These may be arranged as follows:—

Median, corresponding to the width of the sternum. *a.* Supral, corresponding to the depression above the sternum. *b.* Upper l, extending to the lower border of the third cartilage. *c.* Lower l, from the third cartilage to the lower end of the sternum.

Antero-lateral, bounded internally by the margin of the sternum; ally by the acromial line on each side. *a.* Supra-clavicular, ling the space above the clavicle, and bounded superiorly by a om the outer third of this bone to the trachea. *b.* Clavicular, ponding to the inner half or two-thirds of the clavicle. *c.* Infraular, limited below by the lower margin of the third rib. *d.* Mammary, from the third rib to the sixth. *c.* Infra-mammary, from the rib to the lower margin of the thorax.

3. Lateral, bounded in front by the acromial line; behind b axillary border of the scapula. *a.* Axillary, from the apex of the down to a line continuous with the lower boundary of the mam region. *b.* Infra-axillary, from the above line to the lower marg the thorax.

4. Posterior, from the axillary edge of the scapula to the middl behind. *a.* Supra-spinous or superior scapular, corresponding t supra-spinous fossa of the scapula. *b.* Infra-spinous or inferior sca opposite the infra-spinous fossa. *c.* Infra-scapular, below the scap the margin of the thorax, and extending internally to the spine Inter-scapular, including the space between the base of the scapul the spinous processes of the corresponding dorsal vertebræ.

METHODS AND OBJECTS OF PHYSICAL EXAMINATION.—It is n sary to have a clear comprehension of the different methods of exa tion employed, with regard to their nature; the manner in which ea performed; and what it is capable of teaching; therefore a brief o of this part of the subject will now be given.

I. INSPECTION.—This merely means "the act of looking," an that need be said about it is, that different views of the chest mu taken, from the sides and behind as well as from the front, a light being employed. Inspection reveals:—1. The state of the s ficial parts, as regards colour, œdema, amount of fat, fulness o veins, &c. 2. The shape and size of the thorax, along with which be noted the state of the supra-sternal and supra-clavicular depress the direction of the ribs; the characters of the intercostal spaces size of the costal angles (*i.e.*, the angle between the ensiform car and contiguous rib-cartilages on each side); and the relative heig the shoulders. 3. The frequency, extent, and characters of the ratory movements.

II. PALPATION OR APPLICATION OF THE HAND.—The palmar surf the hand and fingers is applied to the chest, in order to appreciate c impressions which are capable of being conveyed by the sense of t In some cases it may be necessary to grasp the sides, particula children; in others only the tips of the fingers need be used, espe when it is desired to localise the signs; but generally it is best t with as much of the hand as can be applied. The objects of palp are:—1. To give more accurate information as to what is reveale inspection. 2. To determine the existence and characters of va kinds of *fremitus*. This term comprehends certain sensations con to the surface, so that they can be felt, and which are classed (i.) *Vocal fremitus*, produced by the act of speaking or crying. *Tussive fremitus*, originated by coughing. (iii.) *Rhonchal fremitu* to the passage of air during the act of breathing through the air- under certain physical conditions. (iv.) *Friction fremitus*, elicit the rubbing together of roughened surfaces of the pleura. 3. To c the presence of any fluctuation, or succussion-movement.

III. MENSURATION OR MEASUREMENT.—In some cases it is imp to obtain accurate information as to the size and shape of the chest the extent of the respiratory movements. For this purpose c measurements are taken while the chest is at rest, and in different states as regards expiration and inspiration. The only measurements likely to be required are:—1. Circular or circumferential in different parts of the chest. 2. Semicircular, so as to compare the two sides. 3. Antero-posterior, in the middle line and on either side, especially under the clavicles; and transverse, noticing the relations of these two diameters. 4. Vertical, from the middle of the clavicle to the lower margin of the thorax. 5. Local, particularly from the nipple to the mid-sternal line; and to the clavicle on each side. The requisite instruments include an ordinary tape-measure; a double tape-measure made by uniting two so that they start from the same point, which is useful for comparing the two sides, the point of junction being applied to the middle line behind, and the tapes drawn round, one on each side of the chest, until they meet in the mid-sternal line; and different moveable calipers, by which the diameters are taken. Several ingenious instruments have been invented for the purpose of indicating the respiratory movements very precisely, but they are of little practical value.

In some instances it is essential to get an outline of the shape as well as the size of the two sides of the chest in different parts, in order to determine the exact capacity of each, as this depends much on the form, the measurement being sometimes actually less on the side which has the larger sectional area and volume. This is accomplished by means of the *cyrtometer*, a convenient form of which consists of two portions of flexible lead-tubing of small calibre, united by a short piece of india-rubber tubing. The latter is fixed over the spine, and the two parts of lead-tubing are brought round the sides until they meet in the middle line in front. When the instrument is removed it indicates the shape as well as the size of each side, and the outline may then be traced on paper. Another kind of measurement which may be here mentioned is that by which it is sought to ascertain the actual capacity of the lungs, some form of *spirometer* being employed. At present this instrument is more of physiological interest than of practical value in diagnosis.

IV. PERCUSSION.—By this is meant "the act of striking," and it affords signs of the highest value in diagnosis. There are two ways of performing percussion, viz., first, by striking the part under examination immediately, which is called *immediate* or *direct* percussion; secondly, by placing something on the surface, technically named a "pleximeter," and percussing over this, which is termed *mediate* or *indirect* percussion. As a rule the latter mode should be employed, but the former is useful sometimes, especially when examining over bones, such as the clavicle. A great deal of discussion has been carried on as to the relative value of instruments or the fingers in percussion. Some use plates of ivory or other materials to place on the chest; and a light flexible "hammer" or "plessor" to strike with. Other instruments are also employed, but without entering into any discussion on the subject, I venture to express the opinion that the use of the fingers alone is much preferable, and answers every necessary purpose. The following description may give some notion as to how this mode of examination is to be conducted:—First. One of the fingers of the left hand should be used as a pleximeter, especially the fore- or middle-finger, but the little finger is conveniently applied when percussing above the clavicle. It must be laid on evenly and firmly, with the palmar aspect next the surface. Secondly. Percussion must then be made with the ends of the fingers of the right hand, the nails being appropriately shortened. Some use all the fingers in this way, either arranged in a line or gathered into a cone with the thumb; others employ only three, two, or one. It is well to practise all methods, but ordinarily the fore- and middle fingers together answer best, or in light percussion the middle finger alone. Thirdly. The force employed must vary according to circumstances, but usually it should only be moderate. Fourthly. The stroke should be made perpendicularly to the surface; from the wrist; quickly and sharply; the fingers not being allowed to remain on too long.

The objects of percussion are to elicit—1. Certain sounds. 2. Different sensations as regards amount of resistance, elasticity, fluctuation, &c. These will be considered in detail later on.

V. AUSCULTATION.—This signifies the "act of listening," which may also be performed in two ways. The ear may be applied to the chest either directly or with only the intervention of a handkerchief or towel, which is termed *immediate* or *direct* auscultation; or the "stethoscope" may be employed as a medium of communication between the part to be examined and the ear of the operator, this constituting *mediate* or *indirect* auscultation. For many reasons the latter method should be practised as a rule; but the former is often advantageously adopted, especially in the examination of children, and when listening over the back. It is impossible to enter here into any discussion with regard to the innumerable stethoscopes recommended. A great deal more depends on the ability to auscult and the knowledge of what is to be heard than on the kind of instrument employed; and any simple ordinary stethoscope answers perfectly well if the auscultator is competent. A convenient instrument is one made of a single piece of wood, such as deal or cedar, with a moderate-sized hollow stem, a well-fitting slightly hollowed ear-piece, and rather a small chest-extremity, such as will fit into the intercostal spaces. In using it care must be taken that the chest-end is applied in its whole circumference, without undue pressure; and also that the ear is properly placed on the ear-piece. During auscultation the stethoscope must not be held by the fingers; and care must be taken that it is not touched by clothing or any other article which might occasion abnormal sounds.

So far as the respiratory organs are concerned, the object of auscultation is to investigate sounds, viz.:—1. The *respiratory* or *breath-sounds*. 2. *Râles* or *rhonchi*, which are adventitious sounds originating in the lungs from certain abnormal physical conditions. 3. *Friction sounds*, due to the rubbing together of roughened surfaces of the pleura. 4. Certain peculiar sounds, viz., *metallic tinkling*, *amphoric echo*, and the *bell-sound*, met with in rare conditions of the lungs or pleuræ. 5. *Vocal resonance*, or the sound produced during the act of speaking or crying; and *tussive resonance*, or that elicited by the act of coughing.

VI. SUCCUSSION.—Rarely required, this mode of examination simply means "shaking the patient," when a *splashing sensation* is felt, or a *splashing sound* heard in exceptional cases where a mixture of air and fluid exists in the pleural cavity.

VII. DETERMINATION OF THE POSITION OF ORGANS, WITH THE

VIEW OF DETECTING DISPLACEMENT is ordinarily ranked as a special method of examination, but in reality it is merely a conclusion founded on the information derived from some of the other modes already considered. At the same time displacement of organs, both thoracic and abdominal, does often give most valuable aid in the diagnosis of abnormal conditions.

VIII. THE USE OF THE ASPIRATEUR OR TROCHAR may be classed as a mode of examination, as these instruments sometimes afford most important aid in the diagnosis of morbid conditions within the chest.

Certain other modes of examination have been described, but at present they are not of sufficient practical value to call for notice in this work.

I. SHAPE AND SIZE OF THE CHEST.

The size and shape of the chest are ascertained by *inspection*, *palpation*, and *measurement*. They may be considered together, as they generally bear a close relation to each other, the thorax being larger the more it approaches the circular form; while both the capacity and shape depend considerably on the direction of the ribs and their relation to each other. In healthy children the thorax is comparatively large and nearly circular; in adults it is usually more or less elliptical during ordinary breathing, the long diameter being transverse. However, many diversities of form may be observed within the range of health, and though there ought to be no obvious want of symmetry between the two sides, slight differences can generally be detected.

(i.) DEVIATIONS FROM THE NORMAL NOT DUE TO EXISTING DISEASE.

1. The thorax may be small and contracted in its capacity, this condition being either congenital or acquired. Two forms of small chest are met with, viz.:—*a*. That in which the ribs are very oblique and the spaces wide; the chest is long and narrow in all its diameters; the costal angles are very acute; whilst the scapulæ are often tilted up behind like wings, this form of chest having on this account been termed *alar* or *winged*. *b*. That in which the front of the chest is flattened, so that the antero-posterior diameter is very small.

2. Some important deformities of the chest are originated during the period of infancy and childhood, as the result of an insufficient amount of air entering the lungs during the act of breathing. This is due either to some obstruction in the air-passages; to a weak condition of the muscles which expand the chest; or to both these causes combined; and the deformities are more liable to occur in proportion to the yielding nature of the thoracic walls. When these conditions exist, sufficient air does not reach the lungs during inspiration to enable them to fill up the vacuum produced by the descent of the diaphragm, and hence the chest is driven in to a greater or less degree by external atmospheric pressure, being also partly drawn in by the action of the diaphragm, and possibly of other muscles. The chief causes originating obstruction are bronchitis; hooping-cough; laryngismus stridulus; croup; and chronic enlargement of the tonsils.

Four special deformities of the chest may be described.

a. *Transversely-constricted*. This is a very frequent deviation from the normal, the front of the lower part of the chest presenting a more or less deep groove or depression, passing obliquely outwards and downwards from the ensiform cartilage.

b. Pigeon-breast. Here there is a falling in of the true ribs on each side, so that they become more or less straight in front of their angles, while the sternum is projected forwards. Hence a transverse section of the chest would be triangular, with the base behind and the apex in front. The ensiform cartilage is also frequently bent sharply backwards at its junction with the sternum, where there is therefore an angular prominence. More or less transverse constriction is always observed.

c. Anteriorly-depressed. Occasionally the part of the sternum below the third cartilages is considerably depressed, so as to present a concavity of variable depth, carrying with it the contiguous portions of the rib-cartilages. In some instances this deformity is congenital, but by no means always.

d. Rickety. The true rickety thorax is very characteristic. It is flat posteriorly as far as the angles of the ribs, where there is a marked bend; on each side a groove runs obliquely downwards and outwards, which may extend from the first to the ninth or tenth ribs, but is most marked about opposite the fifth, sixth, and seventh; this corresponds mainly to the line of junction of the ribs with their cartilages, which is indicated by a series of nodular swellings, but the bottom of the groove is formed more by the ribs than the cartilages. In front of it the cartilages are more or less curved, and the sternum is somewhat prominent, so that the antero-posterior diameter is increased. The greatest lateral diameter is opposite the angle of junction between the dorsal and lateral regions; and the shortest corresponds to the bottom of the lateral depressions. The solid organs underneath will influence the form of the rickety chest.

3. The thorax may be deformed as the result of occupation; the pressure of stays or belts; or previous injury to or disease of the ribs or spine.

(ii.) CHANGES IN SHAPE AND SIZE DUE TO EXISTING DISEASE.

1. *General enlargement.* In this condition the chest is more or less expanded, approaching to the form and size it presents after a deep inspiration, or even going beyond this, so as to become "barrel-shaped." The enlargement may involve the whole length of the thorax, or only its upper part. *Causes. a.* Emphysema usually. *b.* Extreme double pleuritic effusion very rarely.

2. *General diminution.* This is the opposite of enlargement, and the thorax may assume either the alar or flattened form. It may result from phthisis, but the two sides are rarely contracted to an equal extent, while local depressions are usually observed in this disease.

3. *Enlargement of one side.* Whenever any difference in the two sides is supposed to exist, it is well always to take an accurate outline by means of the cyrtometer. An enlarged side is usually more rounded and appears short, with a long antero-posterior diameter and a large costal angle. The shoulder is raised, and the spine curved to the opposite side. *Causes. a. In connection with the pleura.* (i.) Pleuritic

ffusion in the great majority of cases. (ii.) Occasionally pneumohorax or hydro-pneumothorax. (iii.) Very rarely hæmothorax. *b. In mnection with the lung.* (i.) Hypertrophy or distension of one lung. ii.) Secondary cancer.

4. *Diminution of one side* or *Retraction.* The characters are the everse of those observed in enlargement, the entire side appearing mall and cramped, with the ribs aggregated together. *Causes. a.* In ost instances pleuritic adhesions and thickenings, binding down the ng so that it cannot expand. In all cases of retracted side pleuritic dhesions are formed after a while. *b.* Collapse of the lung from any ause. *c.* Changes in the lung-structure, diminishing its volume and ower of expansion, viz. :—phthisis ; chronic or interstitial pneumonia ; rimary cancer.

5. *Local enlargement* or *bulging.* This necessarily varies much in its ite, extent, and form, and accurate measurement may be required to etermine it. *Causes.* The most frequent and important causes of ulging of the chest are enlargements of the heart ; pericardial effusion ; nd aneurisms of the great vessels, to which attention will be directed ereafter. The remaining causes, which are very uncommon, may be numerated here, viz. :—*a. Conditions of the pleura.* (i.) Empyæma ointing on the surface. (ii.) Localised or basic pleuritic effusion. ii.) Localised pneumothorax. *b. Conditions of the lung.* (i.) Pneuonia at the base or apex. (ii.) A large phthisical cavity at the apex. ii.) Localised emphysema. (iv.) Very rarely hernial protrusions. Mediastinal tumours ; or occasionally enlarged glands growing down om the neck. *d.* Enlargements of the liver or spleen. *e.* Disease of e sternum or ribs, or of their investing periosteum ; as well as supercial abscesses and growths.

6. *Local diminution* or *depression.* *Causes.* (i.) Phthisis, owing to the cal changes in the lung and the accompanying pleurisy, especially in e supra- and infra-clavicular regions. (ii.) Local pleuritic adhesions.

7. The *costal angles* and *intercostal spaces* are often altered in size, and he latter are frequently abnormally bulged or depressed, as the result of orbid conditions of the pleura. Anything that affects the size of the hest generally or unilaterally will necessarily influence that of the costal ngle and intercostal spaces ; and the latter will also be altered locally long with any local bulging or depression.

II. Movements of Respiration.

The respiratory movements are also studied by *inspection*, *palpation*, nd *mensuration*. When examining for disease it is necessary to observe hem during ordinary and forced respiration.

Without entering into the physiology of the respiratory movements at ny length, it will be advisable to call attention to the following practical oints :—1. They are partly costal or thoracic ; partly diaphragmatic or bdominal. The thoracic movements are made up during inspiration of levation and expansion ; during expiration of depression and retraction. . In health there is no obvious difference in the movements of the two ides. 3. In males and children the diaphragm and lower ribs chiefly act during breathing, the movements being abdominal; while in females the upper part of the chest moves most, and breathing is upper costal. During forced respiration the movements are mainly upper costal in all persons. 4. The ordinary number of respirations ranges from 16 to 20 per minute. 5. Expiration is slightly longer than inspiration, in the ratio of about 12 to 10 in males, 14 to 10 in females. 6. The intercostal spaces in most parts become rather more hollow during inspiration; as well as the supra-clavicular fossæ. This is especially seen when a deep breath is drawn, and the sinking of the spaces is best observed towards the lower and lateral part of the chest. 7. Inspiration is entirely effected by muscular action; expiration chiefly by the elasticity of the lungs and chest-walls, aided somewhat by muscular force, which is much more called into play during forced expiration.

ABNORMAL RESPIRATORY MOVEMENTS.

The deviations from the normal which the respiratory movements present, may be arranged in the following manner:—

A. *Alterations affecting the general movements.*

1. *Alterations in frequency.* The respirations may be counted either by watching the movements, or by applying the hand quietly over the the epigastrium. Their frequency may be :—(i.) *Increased. Causes. a.* Most conditions which interfere with the action of the lungs in any way, and give rise to any form of dyspnœa. *b.* Many cardiac affections. *c.* Certain nervous disorders, *e.g.*, hysteria. *d.* An unhealthy state of the blood, such as that present in anæmia or fevers. (ii.) *Diminished.* A slow rate of breathing is often noticed in apoplexy, narcotic poisoning, and some nervous derangements, *e.g.*, trance.

2. *General movements in excess.* The patient breathes deeply and with unusual force, the extraordinary muscles being brought into play; the range of movement is greater; and more air is changed. *Causes. a.* Anything that interferes with the functions of the lower part of the lungs, such as disease in itself, *e.g.*, pneumonia, congestion, œdema, bronchitis; accumulations in the pleuræ; or abdominal enlargements (ascites, enlarged liver). *b.* Cardiac diseases which impede the circulation of the blood, and hence interfere with its proper aëration. *c.* Certain abnormal conditions of the blood itself, such as anæmia and chlorosis.

3. *General movements deficient.* This deviation may be associated either with increased, normal, or diminished frequency. *Causes. a.* Anything that extensively obstructs the functions of the lungs, *e.g.*, capillary bronchitis, double pneumonia, or effusion into both pleuræ. *b.* Painful chest-affections, *e.g.*, acute pleurisy or pneumonia, pleurodynia, intercostal neuralgia. *c.* Rarely interference with the action of the respiratory muscles from spasm or paralysis. *d.* Certain conditions of the central nervous system, *e.g.*, narcotic poisoning and trance. *e.* Very rarely infiltration of the chest-walls with cancer.

4. *Altered relation between the thoracic and abdominal movements.* (i.) *Thoracic movements in excess from diminished action of the diaphragm.*

uses. *a.* Usually some accumulation in the abdomen, mechanically erfering with the descent of the diaphragm, such as ascites, flatus, or nours. *b.* Conditions which render movement of the diaphragm or dominal walls painful, especially peritonitis, but also diaphragmatic urisy, rheumatism, and inflammation of the diaphragm or abdominal lls. *c.* Extreme pericardial effusion. *d.* Paralysis of the diaphragm m any cause. (ii.) *Diaphragmatic and abdominal movements in excess.* *uses.* *a.* Any condition which is attended with pain on bringing the est-walls into play, *e.g.*, pleurisy, pleurodynia. *b.* Paralysis or spasm the chest muscles. *c.* Obstruction in connection with the air-ssages, preventing the entrance of a sufficient amount of air.

5. *Alteration in the ratio between the expansion and elevation-movements the ribs.* The only important deviation in this respect is a diminun in the expansion-movement, which may amount to its complete sence. It is especially observed during forced breathing, when there y appear to be considerable movement, but none of the expansile id. *Causes.* *a.* General emphysema, the lungs being already disded and the chest expanded to its utmost extent. *b.* Rigidity of the est-walls. *c.* Anything within or external to the lungs, which either vents them from acting, or interferes with the entrance of air, *e.g.*, conidations, pleuritic accumulations or adhesions, pressure on the air-es.

6. *Alterations in the rhythm of the respiratory act.* Unequal and jerky athing is often noticed in some nervous disorders, such as chorea and steria. The most important change in rhythm, however, is that in which *relative length of inspiration and expiration becomes disturbed*, the forr being more or less short and quick; and the latter prolonged, slowly rformed, and often laboured (*expiratory dyspnœa*). *Causes.* *a.* Dimition in the elasticity of the lung-tissue and chest-walls, which is parularly observed in emphysema with rigid chest. Expiration becomes n either entirely muscular, or far more so than in the normal conion. *b.* Some obstruction to the passage of air through the principal -passages.

7. *Depression of the chest-walls. Inspiratory dyspnœa.* Instead of panding during inspiration, the chest may fall in to a greater or less tent, especially at its lower part, producing either temporarily or pernently one of the forms of deformed thorax already described. This viation is chiefly observed in children. *Causes.* *a.* Almost invarily some obstruction to the entrance of air into the lungs. The contions to which such obstruction is mainly due are—(i.) Bronchitis. .) Hooping-cough. (iii.) Anything tending to occlude the larynx or chea, *e.g.*, croup, œdema glottidis, laryngismus stridulus, pressure a tumour or aneurism. (iv.) Enlarged tonsils or other impediment out the pharynx. *b.* Occasionally, it is said, very rapid œdema of e lung or hydrothorax.

B. *Alterations affecting unilateral movements.*

1. *Inequality of the respiratory movements on opposite sides.* This is ually due to *deficient expansion* of one side, which may become quite otionless. *Causes.* *a.* Accumulations in one pleural cavity; or ad-

hesions compressing the lung. *b.* Changes in the lung-tissue o side, interfering with its inflation, *e.g.*, acute or chronic pneu phthisis, cancer. *c.* Pressure on either chief bronchus by a t air being thus prevented from passing into the lung. *d.* Painfu tions of one side. *e.* Unilateral paralysis of the muscles occasi When the movements of one side are interfered with, those opposite side frequently become excessive, owing to the lung to perform extra work.

2. *Altered relation of the abdominal to the thoracic movements side.* This is certainly observed occasionally, but it is not of mu sequence.

3. *Unilateral inspiratory dyspnœa.* The chest-wall may fall in side during inspiration, owing to obstruction of a main bronchus

C. *Local changes in movement.*

1. The common deviation met with is a *local deficiency*, in whi expansion and elevation are involved, but especially the forme usual causes of this change are phthisis, and localised pleur hesions.

2. Occasionally a *limited falling-in* during inspiration is obser to obstruction of one of the smaller bronchial divisions.

D. *Abnormal movements of the intercostal spaces.*

In pleuritic effusion, pneumonia, and other conditions whic the movements of the chest, the intercostal spaces frequently exhibit their usual changes of form during the act of breathing some instances of extreme pleuritic effusion an undulatory m perceptible. They are often motionless over the seat of local de in movement.

III. EXAMINATION OF VARIOUS KINDS OF FREMITUS.

A. VOCAL AND CRY-FREMITUS. Vocal fremitus is investig applying the hand to the surface while the patient repeats th "ninety-nine," or counts from one to ten. As already remar cry answers the same purpose in children. The normal variati to the quality of the voice; age and sex of the individual; stat chest-walls; and the part of the chest over which the exami made, must be borne in mind. As a rule vocal fremitus is more on the right than on the left side, especially over the apex in fr

The changes which may be observed in disease are:—

1. *Changes in area.* This may be—(i.) *Increased* in distensio lungs from emphysema or hypertrophy. (ii.) *Diminished*, w lung is retracted by adhesions; or pushed aside by some soli such as an enlarged heart.

2. *Changes in intensity.* (i.) *Increased. Causes. a.* Cons of the lung from any cause, provided that the consolidating m not too abundant, or too hard or pulpy, and that it encloses tu taining air. Vocal fremitus is especially marked if at the sa

the bronchial tubes are dilated, or if cavities of certain characters exist in the lungs. Hence increased vocal fremitus is an important sign of pneumonia, phthisis, chronic pneumonia with dilated bronchi, some cases of cancer, and similar conditions. *b.* Condensation of the lung from compression or collapse. *c.* Bronchitis, congestion or œdema of the lungs, and pulmonary apoplexy, but the fremitus is by no means constantly increased in these affections, and is of little importance. (ii.) *Diminished or suppressed. Causes. a.* Separation of the lung from the chest-wall by some intervening imperfectly-conducting material, *e.g.*, fluid or air in a pleural cavity; enlarged organs or morbid growths invading upon the cavity of the thorax. *b.* Very extensive and dense or pulpy consolidation of the lungs, with obliteration of the tubes, so that no air can enter, *e.g.*, extensive soft cancer, certain cases of phthisis, and pneumonia with rapid and abundant exudation. *c.* Distension of the lungs in emphysema.

These alterations in the intensity of the vocal fremitus may be observed over a very limited region, or over a considerable part of the chest. It is at the base and apex of the lung that they are chiefly important, in distinguishing between fluid effusion and pneumonic consolidation at the base, and aiding in detecting phthisical consolidation at the apex. Increase and deficiency may be noticed in different parts on the same side; *e.g.*, in cases of pleuritic effusion the fremitus is often absent below, but in excess above, on account of the compressed state of the lung.

B. TUSSIVE FREMITUS.—This is affected in much the same way as vocal fremitus, but is of little importance, except when the voice is very weak.

C. RHONCHAL FREMITUS.—Due to the passage of air through the bronchial tubes containing fluid, rhonchal fremitus becomes an important sign of bronchitis or œdema, especially in the case of young children.

D. PLEURITIC FRICTION FREMITUS.—Not often met with, this fremitus indicates the presence of much firm material in connection with the pleura. It is most frequently observed during the later stages of acute pleurisy, but may be very marked in cases of chronic dry pleurisy.

IV. PHYSICAL SIGNS OBTAINED BY PERCUSSION.

A. PERCUSSION-SOUNDS.

SOUNDS IN HEALTH.—Five distinct sounds may be obtained by percussion in a healthy subject, which differ in their degree of resonance, length, fulness, pitch, and clearness.

1. *Tympanitic or drum-like.* In this country the term "tympanitic" is applied to the sound which is elicited by percussing over the abdomen, being dependent upon accumulation of gas within the stomach and intestines. It has considerable resonance, is of prolonged duration, low in pitch, full, and may be either more or less muffled or clear, according to the degree of distension.

2. *Pulmonary or sub-tympanitic.* This is the sound brought out by

percussing over healthy lungs, and which is therefore present greater part of the chest. Possessing a fair amount of resona shorter, less full, and higher-pitched than the tympanitic so ordinarily is muffled. It has been likened to the sound eli striking over a "muffled drum."

2. *Laryngeal, tracheal, or tubular.* As the names indicate, th is produced over the wind-pipe. Much less resonant than thos described, it is also considerably shorter and of higher pitch, a tubular quality; as a rule it is not clear, on account of the s which cover the air-tube.

4. *Bony or osteal.* It is not always possible to get the oste distinctly over the healthy chest, but it imparts its characters sounds, especially over the sternum and clavicles. It can be over any of the bony prominences of the body. With ha resonance, this is a very short, high-pitched, and toleral sound.

5. *Dull or non-resonant.* When percussion is made over soli and structures, the sound elicited is more or less dull, short, and it is supposed that each organ gives rise to a peculiar pitch of but certainly very few are able to appreciate this.

CHANGES AFFECTING THE PERCUSSION-SOUNDS.

When percussing the chest with the view of obtaining eviden ease in connection with the lungs by the aid of the sounds elic points to be noticed are—1. Whether there is any actual chan characters of the pulmonary sound elicited over the chest as or over any part of it. 2. If there is any increase or diminuti extent over which the normal pulmonary sound is heard. 3. If th difference is noticed between the sounds produced after a ful tion and after a deep expiration respectively, either generally o both as regards characters and area. 4. If superficial and dee sion yield different results.

I. CHANGES IN THE CHARACTERS OF THE PULMONARY SC

1. *The percussion sound may become extra-resonant or actuall nitic.—Causes.* (i.) Pneumothorax or hydro-pneumothorax, the amount of air in the pleura is not so great as to stretch th walls very immoderately, when it is found that the sound beco (ii.) Certain states of the lungs, in which there is excess of ai portion to the solid tissues, often with more or less distens emphysema, hypertrophy, atrophy, extreme bloodlessness. conditions the sound is too resonant, but rarely actually tympa

2. Without any marked alteration in quality, ***the pulmonary p sound may become unusually clear***, *e.g.*, in some cases of bronch gestion, œdema of the lungs, or the early period of pneumonia. due to "liquid or solid being mixed intimately with air-c tissues," and the sound under these conditions may even assum lar quality.

3. ***Resonance may be more or less diminished to absolute dulness*** this deviation from the normal exists, it is necessary to note th

of the change, which may vary from a slight deficiency in resonance to the most complete dulness; its situation and extent; the pitch of the sound elicited; the form of the dulness; and, in some cases, whether alteration in posture has any effect upon it. There are two dull percussion-sounds which call for special mention:—1. The *hard wooden sound*, which is very short and abrupt, almost non-resonant, exceedingly high-pitched, and accompanied with a sensation of much resistance. 2. *Putty-like*, this being, as its name suggests, an absolutely non-resonant, dull, heavy, and dead sound. *Causes.* It may be useful to enumerate all the causes which are capable of giving rise to abnormal dulness in various parts of the chest. (i.) Certain affections of the chest-walls, such as infiltrated cancer, diseased or inflamed bone and its consequences, periostitis. (ii.) Accumulations in the pleural sac, of serum, pus, or blood; or its extreme distension with air. (iii.) Excessive solid or liquid materials in the bronchi, air-vesicles, or tissues of the lungs, *e.g.*, pneumonia, phthisis, great congestion or œdema, abscess, extensive bronchitis, thickening and dilatation of the bronchi, cancer. (iv.) Considerable collapse or compression of the lungs; or, on the other hand, extreme distension. (v.) Enlargements in connection with the heart, or solid or fluid accumulations in the pericardium. (vi.) Mediastinal enlargements of all kinds, such as various tumours, enlarged glands, abscess, aneurism. (vii.) Enlarged or displaced abdominal organs, especially liver or spleen; or, rarely, tumours extending upwards from the abdomen.

4. *Peculiar sounds. a. Tubular.* This sound is not uncommonly met with in some part of the chest, but never over any great extent. It resembles that produced over the trachea, varying somewhat in its pitch, and usually being quite clear. *Causes.* (i.) Cavities in the lungs, not too large, superficial or having some firm, well-conducting tissue between them and the chest-walls, and containing little or no fluid. Such cavities are generally associated with phthisis, but may be due to enlarged bronchi. (ii.) The presence of some solid material between the trachea or one of the main bronchi and the surface, forming a well-conducting medium, *e.g.*, any mediastinal tumour, but especially enlarged glands in the posterior mediastinum, the tubular sound being then heard in the interscapular regions, particularly in children. (iii.) Certain conditions in which the lower part of the chest is invaded upon, so that the lung is pushed or floated upwards, some believing it to be in a relaxed, others in a condensed condition; a tubular sound is then perceptible under the clavicle. This is often observed in cases of pleuritic effusion; occasionally in connection with tumours in the chest or enlarged abdominal organs, and consolidation of the lung itself, *e.g.*, pneumonia.

b. Amphoric. This is a peculiar resonant sound, of a hollow, metallic character, and of very rare occurrence. *Causes.* (i.) A very large phthisical cavity in the lungs, situated near the surface, usually adherent, having smooth, thin, but firm walls, and containing chiefly air, with but little fluid. (ii.) Pneumothorax occasionally.

c. Metallic. This is a high-pitched sound, of distinctly metallic quality, not unfrequently tinkling or splashing. It is not always easy to distinguish it from the *crack-pot sound*, and both may be elicited in the same case, according to the force used in percussion, as they dep upon similar physical conditions, viz., a cavity containing air.

b. Crack-pot or *cracked-metal sound*, "*bruit de pot fele.*" Also metallic quality, it has further a cracked character, as its name indica and gives the impression of air being driven out through a chink small aperture. It may be imitated somewhat by clasping the ha loosely together, and striking the back of either of them over the kr so as to drive out the enclosed air. *Causes.* In the chest the crack- sound is caused by air enclosed between two surfaces, the anterior which is yielding, being suddenly expelled through an orifice, and may be met with under the following conditions. (i.) It is most portant as a sign of a cavity in the lung, of good size, superfic containing air, having one or more bronchi opening into it, and its fr wall being more or less yielding. These conditions are best fulfilled phthisical cavities at the apices of the lungs, hence the sign is m commonly observed in one or other infra-clavicular region. In or to elicit it, the patient should open his mouth and turn towards operator, and percussion must be made firmly but rapidly and abrup during the act of expiration. (ii.) In children affected with bronchi or even when very young infants merely cry, a sound resembling crack-pot sound may be brought out in many parts of the chest, there is no difficulty in distinguishing this from that due to a cavi (iii.) In rare instances this sign is observed over the front of the ch in cases of pleuritic effusion, or consolidation of the posterior part a lung.

II. CHANGES IN THE EXTENT OF PULMONARY RESONANCE.—Th area of pulmonary resonance may be :—*a. Increased*, when the lung are distended with air, especially in emphysema, but also as the resul of hypertrophy or temporary inflation. *b. Diminished.* It is not eas to separate this deviation from ordinary dulness, still it affords a important sign of the lung being contracted within its usual limits.

III. EFFECTS OF INSPIRATION AND EXPIRATION UPON THE PER CUSSION SOUND.—*a. There may be no extension in area or increase amount of resonance after a full inspiration, either generally or on one sid and no diminution in the same after a deep expiration. Caus* (i.) Extreme distension with loss of elasticity of the lungs, as emphysema. (ii.) Some obstruction to the passage of air through t air-tubes, *e.g.*, bronchitis, spasmodic asthma. (iii.) Interference with t expansion of the lung, either from external pressure, such as that pleuritic effusion or adhesions; or from extensive disease in itself. T only affects the results of inspiration. (iv.). Air in the pleural cavi which cannot be increased or diminished in quantity.

b. In cases of suspected consolidation at the apex of a lung, wh the signs are not marked, it is very important to notice whether ther a proper difference in the percussion-sounds after a deep inspiration expiration respectively, as regards amount and area of resonance, alteration in pitch.

IV. DIFFERENCE BETWEEN SUPERFICIAL AND DEEP PERCUSSIO This may be of much use in determining the precise physical conditi present in a phthisical lung. Superficial percussion may give ris hard dulness, showing the presence of much consolidation; but on percussion a crack-pot sound may be elicited, indicating the existence of a cavity within the consolidation.

B. Sense of Resistance or Elasticity.

When percussing, the sensation which is conveyed to the fingers should always be noted. The information thus obtained is mainly useful—*a*. In making out the state of the chest-walls as to rigidity, elasticity, distension by air, &c. *b*. In distinguishing between dulness due to fluid or some solid mass. *c*. In determining the amount and actual density of any solid accumulation.

V. Physical Signs obtained by Auscultation.

A. Respiratory Sounds.

Sounds in health.—In health three typical sounds may be heard during the act of breathing, on listening over different parts of the respiratory apparatus.

1. *Tracheal* or *Laryngeal*. Heard on applying the stethoscope immediately over the windpipe in the neck, this sound has the following characters:—It is very loud, hollow, and high-pitched; begins simultaneously with the act of inspiration, and continues of the same intensity throughout; there is a marked interval between the inspiratory and expiratory sounds; and the latter is well heard, being rather the longer, louder, and higher pitched. This sound is laryngeal in its origin.

2. *Bronchial*. This differs from the former in the following particulars. It is not hollow, or so loud or high-pitched; has a harsh quality; is not quite so rapidly evolved; does not present such a distinct interval between inspiration and expiration; and the latter is shorter than in the tracheal sound. Bronchial breathing may often be heard normally in the interscapular regions, and over the upper part of the sternum and contiguous end of the clavicle. It is the laryngeal sound modified by conduction along the larger bronchi.

3. *Pulmonary* or *Vesicular*. On listening over the greater part of the chest, a soft, breezy sound is heard during inspiration, gradually developed but continuous; no interval can be observed between it and the expiratory sound, which, when present, is very much shorter and more feeble, though rather harsher and lower pitched, but not infrequently it is quite inaudible. Some believe that the pulmonary sound is actually originated in the air-vesicles; others that it is either entirely or in part the laryngeal sound conducted and modified.

Several conditions influence the breath-sounds in health, but only *age* and *sex* can be here alluded to. In children they are very loud, and expiration is prolonged, this breathing being termed "puerile." In aged persons the sounds are weak, but expiration is usually lengthened. In females they are usually loud, and often jerky.

CHANGES IN THE BREATH-SOUNDS OVER THE CHEST DUE TO DISEASE.

I. CHANGES IN INTENSITY.—1. *The breath-sounds may be weakened in various degrees, or completely suppressed, either over a limited region; over one side; or over the greater part or whole of the chest. In some conditions they seem to be deep and distant. Causes. a.* Anything interfering with the entrance of air through the air-passages into the lungs, whether due to spasmodic constriction, internal obstruction, or external pressure. *b.* Imperfect respiratory movements, on account of pain, paralysis or spasm of the muscles, or any other cause. *c.* Permanent distension of the lungs, so that little or no air can enter them, as in emphysema. *d.* Any condition which, by pressing upon the lungs prevents them from expanding, or interferes with the transmission of sound, *e.g.*, pleuritic accumulations of all kinds, extensive adhesions, abdominal enlargements invading upon the chest, intra-thoracic tumours. *e.* Very extensive or very dense consolidation of the lungs, *e.g.*, extensive cancer, certain cases of phthisical or pneumonic consolidation. *f.* Conditions in which the respiratory sounds are obscured by râles, *e.g.*, capillary bronchitis or pulmonary œdema.

2. *The respiratory sounds may be "puerile," being increased in intensity, the expiratory portion becoming then unusually distinct. Causes. a.* If one lung or any portion of one or both is called upon to do extra work, in consequence of interference with the functions of the other lung or parts, the respiratory sounds become puerile over the corresponding regions. This is observed, for instance, in cases of pleuritic effusion or adhesions, consolidation of parts of the lungs, or obstruction of a bronchus. *b.* When a bronchus is suddenly relieved of spasm, the breathing becomes exaggerated over the portion of lung to which its ramifications pass.

II. CHANGES IN RHYTHM.—Many deviations in rhythm are described, but only two can be readily appreciated, so as to be practically useful.

1. *The breath-sounds may become more or less jerky or wavy, so as sometimes to have a cogged-wheel rhythm, especially the inspiratory sound.* This is by no means a reliable sign of disease, especially in females, in whom it is often met with if they are at all nervous or hysterical, while it frequently depends upon excited cardiac action. It may be observed —*a*, in painful affections of the chest, such as early pleurisy or pleurodynia, when the patient often breathes in a jerky manner; *b*, in the early stage of phthisis; *c*, in connection with the old pleuritic adhesions.

2. *The most important change in rhythm is a prolongation of the expiratory sound, so that it may become twice or even three or four times the length of that of inspiration, which often becomes actually shortened.* Prolonged expiration generally attends certain alterations in the breath-sounds to be immediately noticed, but it may be the main or the only alteration observed. *Causes. a.* Emphysema, the elasticity of the lungs being more or less diminished. *b.* Obstruction to the exit of air through the respiratory passages.

III. CHANGE IN THE EXTENT OVER WHICH THE BREATH-SOUNDS

IEARD.—This may be:—1. *Increased*, from distension of the lung. *iminished*, owing to retraction.

. CHANGES IN QUALITY, ALONG WITH OTHER CHARACTERS.— very important abnormal breath-sounds are met with, which differ ly from those ordinarily heard over the chest, in their quality, pitch, m, and other particulars.

Harsh or *rough breathing*. As its name indicates, this merely es a harshness of the sound, the soft, breezy character being ng, which is specially marked during expiration, this being unduly hened. It is not very reliable as evidence of disease, but is fre- ly observed in connection with slight consolidations, bronchial rh, emphysema, the early period of pneumonia, and various other id conditions.

Bronchial. In its character this corresponds with the normal l thus named, but it is heard in unusual regions, or is unusually ed. *Causes*. *a*. All forms of consolidation of the lungs, if mode- in amount and contiguous to the surface, *e.g.*, phthisis, cancer, ic pneumonia, some cases of acute pneumonia. Even when the enclose small cavities or dilated bronchi, the breathing is often hial, provided sufficient solid material intervenes between them he surface. *b*. Condensation of the lung from pressure.

Blowing. Though approaching on the one hand to bronchial hing, and on the other to tubular, this sound has sufficiently dis- ve characters to merit recognition. It differs from the former in arkedly "blowing" quality, being clearer and higher-pitched; from atter in being diffused, and not hollow or as if originated in a zed tube. *Causes*. *a*. Diffused consolidation, not too abundant, phthisis, pneumonia. *b*. Small cavities or dilated bronchi sur- led by solid material.

Tubular.—A high-pitched, concentrated, somewhat hollow and llic sound, this much resembles the normal tubular breathing heard the trachea, and gives the impression of being directly conveyed a tube. *Causes*. *a*. Acute pneumonia, in which disease it is often e most typical kind. *b*. Certain cavities in the lungs. *c*. A solid of moderate size intervening between the trachea or a main bron- and the chest-wall, so as merely to form a medium of communica- between them.

Cavernous. This is a clear, distinctly hollow sound, varying in its , which tends to be low, especially during expiration. It is usually perceived over a limited area, and strikes the ear as being produced hollow space, its exact characters varying according to the dimen- and other characters of this space. *Causes*. *a*. A cavity in the of some size, tolerably superficial, and not containing much fluid. rare instances, it is said, consolidation around an ordinary-sized hus.

Amphoric.—A still more hollow sound, and of peculiar metallic ty, amphoric breathing resembles the sound heard on blowing a large empty glass bottle. *Causes*. For its production it is neces- to have an extensive empty cavity, with firm and smooth walls, which air enters more or less freely. These conditions are found *a*. Pneumothorax *most frequently*, air entering the pleura through an opening in the lung. *b.* Phthisical excavation in the having one or more bronchi communicating with it.

The morbid sounds just described may be heard in diffe the same chest, or may be observed in succession over the as the physical conditions change, there being no marked b between them, but a gradual transition from one to anoth stance, in phthisis the breathing, which is at first bronchial, blowing, especially in certain regions, and then in succes cavernous, or even amphoric, as cavities form and increase i hollow sounds, though usually present during inspiration tion, may only be heard during the former act. A deep b causes them to become much louder, and frequently a enables them to be heard where they did not exist before, displacement of some obstructing secretion, or the emptying They may appear to be superficial and strong; or more and feeble. Care must be taken not to mistake a con ryngeal sound for cavernous respiration.

7. In exceptional instances *peculiar respiratory sounds* a In connection with some cavities they may have a *sucki* character. Sometimes the air appears to be drawn away du tion, and puffed back during expiration; this is termed *veiled puff.*

B. RÂLES OR RHONCHI.

These terms are applied to certain adventitious sounds the lungs or air-tubes. Before proceeding to their consid necessary to mention that they may be simulated by sounds ing contraction of the muscles of the chest-walls; subcutane hairs on the surface of the thorax; fluid in the mediast tissue; or the opening up of healthy lung tissue during a tion.

Râles or rhonchi are generally produced by the passage the act of breathing:—(i.) Through bronchial tubes narrow ening of the mucous membrane; by various deposits upo such as thick secretion or exudation; or by spasm of t fibres. (ii.) Through fluids of variable consistence, either normal or enlarged air-tubes or vesicles, or in cavities i (iii.) Through substances originally solid, which have co soften. (iv.) Into air-vesicles, either of normal size or e walls of which are collapsed or stuck together, thus caus open up. In rare instances the action of the heart caus sounds, when there is much fluid in contiguous tubes or ca

The following points must be noticed with regard to titious sounds:—1. Their characters, viz., whether dry or l or small; peculiar quality, such as musical, crackling, bubbli whistling, &c.; pitch; whether at all hollow or metallic, an to which this character is present. 2. If they are heard inspiration or expiration, or only during one of these act situation and extent. 4. Their amount. 5. Whether they or only heard at intervals; and if they are affected by a ful or cough.

CLASSIFICATION AND SPECIAL CAUSES OF RÂLES OR RHONCHI.

So many different classifications of râles or rhonchi have been invented, and such confusion has prevailed with regard to the meaning of the various terms employed, that it is by no means easy to fix upon any classification. I have, however, adopted the following:—

I. VIBRATORY OR DRY MUSICAL RHONCHI.—These sounds are produced by air traversing air-tubes narrowed in some of the ways mentioned above. They vary in their precise characters according to the size of the tube affected, and the immediate cause of the narrowing. They are grouped as follows:—1. *Sonorous.* This is a deep-toned, low-pitched sound, varying much in its exact quality, which may be snoring, growling, humming, cooing, &c.: it appears superficial, is often extensively heard, and generally accompanies both inspiration and expiration, but may be limited to either act, especially the latter. 2. *Sibilant.* This is of much higher pitch, often whistling, hissing, or musical; not so extensively heard; and as a rule accompanies both inspiration and expiration. Both these classes of rhonchi are liable to much irregularity, disappearing from time to time, especially after a cough, and they often occur together. *Causes. a.* Bronchitis, especially chronic, but also the acute form in its early stage, and the plastic variety. *b.* Spasmodic contraction of the bronchial tubes in cases of asthma.

II. CREPITANT RHONCHI.—1. *True crepitant rhonchus.* This is a sound only met with in the early stage of acute pneumonia, and is therefore observed usually towards the base of the lung, but may be heard in any part where the inflammatory process is commencing. It consists of a great number of extremely minute, sharp, crepitant or crackling sounds; equal in size; perfectly dry; heard in short puffs during inspiration alone in most cases, and often only towards its termination; increased in amount by a deep breath. It has been aptly compared to the sound produced by rubbing a lock of hair firmly between the finger and thumb close to the ear; or to the burning of salt in the fire. The theories as to the production of the *true crepitant râle* are, that it is due to the opening up of air-vesicles stuck together, which is the most probable; to air passing through thick secretion; or to minute lacerations of lung tissue. 2. *Redux crepitant râle.* Heard in the advanced stage of acute pneumonia, when resolution is taking place, this differs from the former in the crepiti being much less abundant; larger and of unequal size; less dry; and perceived during both inspiration and expiration. It gives the impression of air passing through a thick material, which is the pneumonic exudation undergoing softening. A sound of similar characters is sometimes noticed in phthisis. 3. *A large dry crepitant râle* is said to be observed in some cases of emphysema, not abundant, and resembling the sound produced by inflating a bladder. It is supposed to be due to the opening-up of enlarged vesicles. 4. *Compression or collapse rhonchus.* When the lung is compressed or collapsed from any cause, a râle consisting of a number of small dry crepitations may be slowly evolved at the close of or immediately after a deep inspiration.

III. CRACKLING OR CLICKING RHONCHI.—During the process of softening which the consolidation of phthisis undergoes, certain râles of

a crackling character are developed, such as would be expect
the passage of air through such a material. These are na
1. *Dry crackling* or *dry crepitation*, which consists of some three
crackles or clicks, sharp, abrupt, and dry, only heard usually
inspiration. It indicates the commencement of softening. 2.
humid crackling or *crepitation*. Crackling in character, this
abundant than the dry rhonchus, though the crackles are not
numerous, but they are more moist, as if air were passing throug
consistent substance, and occur both during inspiration and ex
being most marked usually in the former. It accompanies a
vanced condition of softening. These râles are chiefly met wit
apices of the lungs.

IV. MUCOUS, SUBMUCOUS, AND SUBCREPITANT RÂLES.—Th
stitute a very common class of rhonchal sounds, the characters
are easily appreciated. They result from the transmission of air
fluid contained in the air-tubes; and the varieties observed
upon the nature and quantity of the fluid, and the size of the
which it exists. Generally they consist of a number of
"bubbles," but may have a "crackling," "rattling," or s
"gurgling" character. The bubbles vary in size considerably
as in number and pitch. If they are of large or medium
rhonchus is called *mucous;* if small, *submucous;* and if very
subcrepitant, because it then somewhat resembles a crepitant so
accompanies both inspiration and expiration, being general
marked with the former, and it may be so abundant as com
obscure the breath-sounds. A cough often influences these râle
both as to their amount and site, sometimes removing them co
They are most common and most marked at the bases of the l
may be heard universally over the chest. In children, and w
originate in the larger tubes, they are apt to have a somewhat
character. *Causes.* (i.) Bronchitis. (ii.) Œdema of the lun
Hæmorrhage into the bronchial tubes. (iv.) Rarely fluid fro
the lung emptying itself through the bronchi, such as pleuritic

V. HOLLOW RHONCHI.—The essential character of these
sounds is that they are all more or less hollow in quality, an
the impression of being originated in a cavity. For their pro
cavity must exist, containing fluid, through which air passes;
size and other conditions of the cavity will influence their
hollowness and pitch, while the amount and consistence of
will affect the actual quality and abundance of the rhonchus.
may be "bubbling," "crackling," or "gurgling;" very variabl
and amount; and much subject to change. According to the
of hollowness and pitch these râles have been subdivided
varieties as "cavernulous," "cavernous," "amphoric," "
"metallic," &c. They are heard generally with inspiration an
tion, but may be limited to either. A cough often makes t
appear or become more distinct. Ordinary mucous râles oc
assume a hollow character, if produced near a large cavity. T
action sometimes causes cavernous râles by agitating the fluid
tiguous cavity. Phthisis is the disease in which these râles a
observed.

C. FRICTION OR ATTRITION SOUNDS.

y the rubbing together of the adjacent surfaces of either pleura,
n this is the seat of certain morbid changes, adventitious sounds are
ited during the act of breathing, usually termed *friction-sounds*. In
mining for these it is essential to investigate every part of the chest,
especially its lower portion laterally and behind, as they may be
sent over but a very small area; and also to make the patient
athe deeply, otherwise the requisite rubbing together of the surfaces
y not be brought about.
. *Characters.* As a rule friction-sounds are more or less *rubbing* in
lity, varying from a slight *graze* to a loud *grating* sound. They may
creaking, *crackling*, *clicking* or *rumbling*. In not a few cases they
ch resemble crackling or even small mucous râles, but are dis-
guished from these by being unaffected by a cough. *Superficialness*
prominent character of all these sounds. 2. *Site and extent.* The
er part of the chest is generally the seat of friction-sounds, especially
ut the angle of the scapula, and towards the infra-axillary region.
ey are generally limited in extent, sometimes not covering an area
more than an inch, but friction may be heard all over one or even
h sides. 3. *Intensity.* This varies from a scarcely perceptible rub
a sound audible at a distance from the chest. Generally it is mode-
ely loud. 4. *Rhythm.* Friction is usually most perceptible during
piration, but often accompanies expiration also; it may only be heard
the end of a deep inspiration. It is frequently irregular and jerky.
Causes. The pathological conditions in connection with the pleura
ich give rise to friction-sounds are—*a.* Increased vascularity with
minence of the vessels, which may cause a slight grazing. *b.* De-
sit of exudation and proliferation of cellular tissue associated with
urisy, the characters of the sound depending upon the thickness and
nsity of the material formed, and the amount of fluid mixed with it.
Tubercular and cancerous deposits rarely. It may be mentioned
t a cirrhotic liver may cause a sound simulating friction.

D. VOCAL AND CRY RESONANCE.

The chief points to notice with regard to the *vocal resonance* are—
Its intensity and degree of clearness. 2. Its quality and pitch. 3.
e area over which it can be heard. The following are the deviations
m the normal state which are met with :—
1. *The resonance may be more or less weakened to complete extinction over*
riable extent of surface.—*Causes.* (i.) Air or fluid in the pleura, sepa-
ing the lung from the chest-wall. (ii.) Very extensive or dense con-
idation of the lung, such as cancer or some cases of phthisis. (iii.)
nphysema in many cases. (iv.) Intra-thoracic tumours; or enlarged
dominal organs encroaching upon the chest. (v.) Obstruction of the
onchi.
2. *It may be increased in intensity or clearness,* this being often asso-
ted with *alterations in quality and pitch.* Four varieties are recognised
this abnormal condition.

the ear along the stethoscope, and the words uttered may
tinctly understood. It is not uncommonly very intense, and
pleasant sensation to the listener. *Causes.* *a.* Certain
lungs in the great majority of cases. The conditions re
the cavity is of good size, but not too large ; tolerabl
containing much fluid ; with firm but not too thick walls ;
adherent to the chest-walls ; and having one or more bro
cating with it, so that air may enter. *b.* Very rarely
between a large bronchus and the chest-wall. *c.* Occasio
thorax.

A variety of pectoriloquy is described under the term
toriloquy, in which a whisper is clearly heard, and ofte
words can be distinguished. This, however, is not an alt
voice, but merely a modified expiratory sound. It is o
connection with large and superficial cavities, and is
pneumo-thorax, but is not unfrequently noticed in co
phthisical cavities.

(iii.) *Œgophony.*—The vocal resonance has a peculiar *b*
quality in some cases of pleuritic effusion, to which the a
been applied. As a rule it is best heard about the angle
but may vary with a change in the position of the patient.
rities think that it is due to the presence of a thin layer o
the lung and the chest-wall : others that it is caused by flat
of the bronchial tubes, from superficial collapse of the
quence of pressure.

(iv.) *Amphoric resonance.*—In certain large cavities wi
the voice may have the characteristic hollow, metallic ch
as *amphoric.* This is only very rarely noticed in connec
phthisical cavities or pneumothorax.

3. The *area* over which *vocal resonance* can be hear
enced by the same conditions as those which affect th
fremitus.

to practical account are these—1. During the act various rhonchi
elicited, which are not heard during the mere act of breathing,
lly in connection with cavities. 2. Various fluid substances
ave accumulated in bronchial tubes or cavities may be dispersed
elled, râles being thus done away with and the breath-sound
ouder, so that its characters may be better observed. Thus
ay be the means of distinguishing between friction-sounds and
roduced within the lung; and, in connection with cavities,
s or some other breath-sound may be heard after a cough,
eviously respiration has been quite inaudible.

LIAR SOUNDS HEARD IN CONNECTION WITH LARGE CAVITIES.

allic tinkling. Resembling the sound produced by striking a
el with a pin, this is a single, clear, high-pitched, ringing sound,
connection with large air-containing spaces, in which there is a
l. It is supposed to be produced by the bursting of a bubble,
ng of fluid from the top of the cavity, and may be originated
e act of breathing, speaking, or coughing; or, rarely, by the
the heart. Phthisis and hydro-pneumothorax are the diseases
it occurs.

phoric echo. An echo of amphoric character may attend the
y sounds, voice, cough, rhonchi, the heart sounds, or even the
llowing. There must be a large cavity, smooth, and contain-
such as is met with in pneumothorax, and occasionally in

-sound. In some cases of pneumothorax, when a coin is placed
est and struck with another, a clear sound, like that elicited by
bell, may be heard on listening over another part of the

VI. SUCCUSSION.

a mode of examination very seldom required, and merely
presence of air and fluid in a large cavity. The signs pro-
shaking a patient are:—1. A splashing sensation felt by the
A splashing sound. They are occasionally present in hydro-
orax; and extremely rarely in connection with large phthisical

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CHAPTER V.

sent chapter the more important symptoms associated with
tory organs will be briefly considered.

I. DYSPNŒA.—APNŒA.

or *difficulty of breathing* is a symptom requiring careful
n, as it may be made up of several elements which it is im-
distinguish, as well as to localise the cause of the disturbance,
t necessarily situated in the respiratory organs.

ETIOLOGY.—The conditions which give rise to dyspnœa may be thus arranged:—1. Some impediment to the entrance of air through the air-passages, owing to internal obstruction, spasmodic or other stricture, or external pressure. This may exist in any part of the respiratory passages, from the mouth to the bronchi. 2. Mechanical interference with the expansion of the chest-walls, from pressure or rigidity; or with the movements of the diaphragm. 3. Loss of the muscular inspiratory force, owing to paralysis or spasm. 4. Deficient expiratory force, as the result of loss of elasticity of the lungs, or rigidity of the chest-walls. 5. Diminution in the working portion of the lungs, from actual destruction, consolidation, liquid accumulation in the air-cells and minute bronchi, collapse, compression, or obliteration of its minute vessels. 6. Affections of the chest or abdomen which render the movements of respiration painful. 7. Improper conditions of the air inspired, such as its being too rarefied, or containing irrespirable gases. 8. Excessive or deficient supply of blood to the lungs, due to some organic or functional derangement of the heart, obstruction in the pulmonary vessels, actual loss of blood, or violent exercise. 9. Altered quality of the blood, associated with anæmia, imperfect aëration, or the presence of poisonous elements in fevers, renal diseases, pyæmia, diabetes, and other conditions. 10. Nervous disturbance in connection with hysteria, strong emotion, cerebral disease, brain-poisoning, pressure on the vagus nerves or some of their branches, or reflex disturbance.

CHARACTERS OF DYSPNŒA.—In studying any case in which there is apparent dyspnœa, it is requisite to observe the following points:—1. Whether any subjective sensation of want of air is experienced, as well as its degree, which may amount to a feeling of impending suffocation. 2. The rapidity of the breathing. 3. Whether respiration is increased in depth and force. 4. If the relative lengths of inspiration, expiration, and the interval are disturbed. 5. If there are objective signs of great want of breath, indicated by the posture of the patient: by the extraordinary muscles being brought into play; by working of the alæ nasi; or by inability to hold the breath or speak. 6. Whether any noise accompanies the act of breathing, *e.g.*, stridor or rattling. 7. If air enters freely into the lungs or not. Deficient entrance of air is indicated by more or less sinking in of the lower part of the chest, epigastrium, and supra-sternal fossa during inspiration. 8. If there are any signs of imperfect blood-aëration, with their degree. 9. Whether the dyspnœa is constant, paroxysmal, or subject to exacerbations: and if paroxysms are traceable to any evident cause, such as effort, emotion, taking food, or inhalation of cold air.

SIGNS OF APNŒA.—The phenomena which accompany interference with the respiratory functions are due partly to over-loading of the venous portion of the circulatory system, and deficient supply of blood to the arterial portion; but chiefly to the blood being imperfectly aërated, and therefore overcharged with carbonic acid, which acts as a poison, especially upon the brain and spinal cord. At first efforts are made to breathe, more or less violent according to the cause of the dyspnœa, but these diminish and finally cease as the central nervous system becomes poisoned. The face is turgid, at first flushed, but soon purple or livid, or under some conditions it is deadly pale or mottled, with lividity

ps, nose, and eyes. Other parts are also blue or livid, espe-
ils and other distant parts. Distension of the veins is ob-
the eyes tend to be prominent, suffused, and watery. The
becomes reduced, while cold clammy sweats break out.
ptoms soon set in, viz., at first vertigo, disturbance of the
l wandering, twitchings and tremors; followed by drowsi-
por ending in complete coma, convulsions and then re-
e muscles, including the sphincters. The pulse is feeble,
small, but it continues to beat after respiration has stopped,
t may be still acting when the pulse has ceased to be per-
lly this organ also fails if the termination is fatal.
n examination reveals distension of the right side of the
he veins with dark blood; with intense venous congestion
uences affecting all the organs and tissues.
r.—The main indications are:—1. To remove the cause
if possible. 2. To attend to the posture of the patient,
in which breathing is most easily performed. 3. To avoid
ffort, as well as other causes which are liable to bring on
spnœa. 4. To assist the patient by mechanical means,
re available to make up for impaired respiratory forces.
t the supply of air is sufficient, as well as that this is pure
suitable to the conditions of the patient. 6. To ad-
er internally or by means of inhalation or subcutaneous
edies which tend to relieve dyspnœa, especially depres-
smodics, or stimulants. 7. To employ local measures,
plication of sinapisms, fomentations of different kinds or
pes, free dry-cupping over the chest, &c. 8. To treat
this purpose the most reliable means are sinapisms over
other parts; a warm bath, with free cold affusion over the
ulders while in it; slapping the chest with a wet towel;
ration; galvanism along the vagus nerves; and, when
performance of laryngotomy or tracheotomy.

II. Cough.

-The causes of cough may be summed up under the fol-
—1. An irritable condition of the mucous membrane in
he air passages, but especially in the throat and larynx.
larly observed in connection with inflammatory affections,
being then much exalted. 2. Some source of direct
noyance in the throat, larynx, trachea, or bronchi. This
o morbid conditions of normal structures, such as the
epiglottis, or vocal cords; the presence of irritating
ger foreign bodies introduced during inspiration; certain
he air inhaled, such as a very low temperature, or impreg-
ritating gases: or the collection of secretion or morbid
serum, mucus, pus, blood, croupous or diphtheritic de-
same time there is frequently increased irritability of the
. Cough from this cause may be voluntarily excited, but
luntary and irrepressible, especially when the irritation is
rhood of the glottis. 3. Reflex cough. In many cases

cough depends upon reflex irritation, but before deciding that su origin, it is always well to look carefully for some more immediat The source of irritation may be in the lungs or pleuræ; heart cardium; alimentary canal (*e.g.*, dyspepsia, dentition, worms) peritoneum; ear; female generative organs; or external surface unhealthy condition of the blood. This is supposed to give cough by its effect on the nervous system, *e.g.*, the state of th associated with gout or rheumatism. Most commonly, howev local cause can be detected in these cases. 5. Nervous disturb connection with hysteria, brain-disease, or irritation of the re nerves.

CHARACTERS OF COUGH.—This symptom requires investigat respect to the following particulars:—1. The frequency of it rence, and whether it is constant or paroxysmal. 2. The seve duration of the fits. 3. The mode of onset, whether the co voluntary act, or involuntary and irrepressible, preceded by a irritation in any part; or if it is brought on by some obvious ca as exertion, change of posture, inhalation of cold air. 4. Its ch and the sounds which are produced during the act, both in inspira expiration. The chief varieties are hacking, hoarse, wheezing, ringing, metallic, croupy, hooping, crepitous, and aphonic. 5. Wh is dry or attended with expectoration. In the latter case it is n to ascertain whether expectoration is effected easily or with di and also to make a personal examination of the sputa, obser *a.* Their quantity. *b.* General characters as to colour; odour; in one mass or in separate lumps, with the size and shape of th transparency or opacity; amount of frothiness; consistence an of adhesiveness. *c.* If any special substances are evident to th eye, such as blood, fibrinous casts, or calcareous particles. *d.* scopic characters. *e.* Chemical composition in some cases. cough terminates in vomiting; or is followed by relief of any unpleasant symptoms.

TREATMENT.—It is not always desirable to check cough, pr is not excessive, and that it serves some useful purpose in th getting rid of materials accumulating in the lungs; indeed in s stances it has rather to be encouraged. In order to put a st relieve cough the chief indications are:—1. To instruct the voluntarily to suppress the act as much as possible. 2. To re cause of cough if practicable, and avoid everything which is excite it. 3. To administer sedatives and other remedies, whic pointed out under the several diseases. 4. To employ anodyn tions, which are very valuable in some cases. 5. To app remedies to the throat or larynx, when these parts are in a mo dition. 6. To limit or check the formation of secretion in the air-tubes, and thus prevent the necessity for the act of coughin alter its characters, so that it may be more easily discharged. patient is obliged to cough, the act may often be assisted by m means, such as applying a bandage around the lower part of th

III. Hæmoptysis.

noptysis or "spitting of blood" signifies the discharge of blood
ı the mouth from any part of the respiratory organs below the
pening of the larynx. It may come on without any warning, or be
d by premonitory symptoms, such as weight or fulness about the
yspnœa, a sense of heat, tickling in the throat, or a saltish taste.
the blood is brought up by coughing, but it may rise in gulps
any effort, or sometimes comes in a sudden gush, when it may
cape through the nose as well. Not unfrequently vomiting is

The quantity varies from a few streaks in the sputa to an
sufficient to cause instant death. The blood is generally bright
d. and more or less frothy ; but occasionally it is dark and non-
especially when abundant and suddenly discharged. Clots
observed. but the greater portion is usually liquid. There is no
n the blood as a rule. either as regards its general or microscopic
rs. The duration of an attack of hæmoptysis varies much, but
: more urgent symptoms have subsided, the sputa are generally
or some time. Recurrence is a frequent event, and in some
tting of blood occurs periodically.

blood comes from either lung in any quantity, *moist râles* are
; heard over the corresponding part of the chest.

ffects on the general system will depend on the amount of blood
l the rapidity and duration of its discharge. Death does not
ult immediately from hæmoptysis, but may happen either from
ct loss of blood, or from its causing suffocation. Frequently
rile excitement is associated with hæmoptysis, the pulse being
bounding. but soft. Should any blood remain in the lungs, it is
set up inflammation, and there is strong reason to believe that
ay phthisis may be originated.

gy.—The sources of the blood in hæmoptysis, and the morbid
ıs giving rise to this symptom, may be thus classified :—1. In
tances there is no obvious local disease. In this group may be
hæmoptysis from going up a height, severe straining or cough-
lowing wind instruments, which is especially apt to occur in
o are delicate and whose tissues are weak ; vicarious hæmop-
at due to the inhalation of irritating substances or to injury ;
dependent upon an unhealthy state of the blood, *e.g.*, scurvy
a. 2. Diseases of the larynx, trachea, or bronchi, *e.g.*, conges-
ammation, ulceration, morbid growths, especially cancer. 3.
of the lungs, viz., phthisis, cancer, congestion, acute or chronic
ia, abscess, gangrene, hydatids. 4. Mediastinal tumours open-
he air-passages, including also tubercular and cancerous glands.
c diseases, viz., mitral disease, hypertrophy of the right ven-
a weak dilated left ventricle. 6. Disease of the pulmonary
7. Aneurism opening into the air-passages. It must be re-
l that blood sometimes enters the wind-pipe from the throat or
is then expectorated.

ood in hæmoptysis generally comes from the capillaries, but
uently a considerable branch of the pulmonary artery either
or is perforated by erosion. In phthisis minute aneurisms

have been found upon the branches of this vessel, which have
and thus caused large hæmorrhages.

There may be no immediate *exciting cause* of hæmoptysis
brought on by exertion, coughing, or some other disturbance.

DIAGNOSIS.—Hæmoptysis may be simulated by bleeding
mouth or throat; or by epistaxis. The quantity and charact
blood discharged; the mode of ejection; and, above all, tho
amination of the nose, mouth, and fauces, as well as of the
generally indicate the source of the bleeding. The part of th
tory apparatus from which the blood escapes is also usually a
by physical examination, and by the local symptoms present.
of a large branch of the pulmonary artery is characterise
coughing up of a quantity of dark blood. The diagnosis
hæmoptysis and hæmatemesis will be pointed out after the la
tom has been considered.

TREATMENT.—Hæmoptysis must be treated on the princi
cable to hæmorrhages in general, but its management will
vary according to its cause. Ordinarily, when the blood es
the lungs the chief things to be attended to are to keep
entirely at rest in a cool room, in the recumbent posture wit
rather high; to subdue cough as much as possible; to give i
freely; and to administer astringents with vascular sedativ
acid in full doses with opium every two or three hours; aceta
and opium; dilute sulphuric acid with alum; turpentine; ar
rye, are the most useful remedies. At the Brompton Hospita
acid and opium mixture is found very efficacious. The sub
injection of ergotine has of late years come into much repute
is most valuable if the heart is acting excitedly. Saline ap
useful in plethoric patients. Some practitioners have recours
section or local abstraction of blood, but this is rarely a desi
of treatment. The application of ice to the chest is often e
beneficial, but it must be done carefully, the ice being re
degrees. Dry cupping over the chest is serviceable in some
is sometimes useful, when a case does not yield to ordinary
to draw the blood towards the limbs by means of hot foot
Junod's boot; or to apply ligatures around them. In ha
vicarious of menstruation or due to stoppage of bleeding from
application of leeches to the lower extremities or around the a
to do good. In all cases of hæmoptysis of any moment, it is
to keep the patient under observation until any irritation
presence of the blood in the lungs has entirely subsided.
any tendency to spitting of blood, everything likely to bring on
must be avoided, while the condition of the blood is improve
dieting and the administration of tincture of steel.

CHAPTER VI.

DISEASES OF THE LARYNX AND TRACHEA.

I. ACUTE INFLAMMATION—ACUTE LARYNGITIS AND TRACHEITIS.

ETIOLOGY.—*Predisposing causes.* Acute inflammation of the larynx and trachea assumes different forms and degrees of intensity, but they are all predisposed to by certain conditions, viz., a lax, weakly, and ill-nourished condition of the system; effeminate habits; immoderate wrapping up of the neck; previous attacks, especially if repeated; and a climate or season characterised by a cold moist atmosphere, cold winds, or rapid changes of temperature, the complaint being, therefore, more prevalent during winter and spring. Males suffer more than females. As regards age, laryngeal catarrh is most common among adults, but the croupous variety is essentially a disease of childhood, especially from the first to the seventh year, it being rarely met with after ten years of age. Unfavourable sanitary conditions predispose to croup, and the children of the poorer classes chiefly suffer.

Exciting causes. The causes of acute laryngitis may be enumerated as follows:—1. Direct irritation, from breathing very cold or hot air, steam, acrid vapours, or air containing irritating particles; or from swallowing boiling or corrosive liquids. 2. Excessive coughing, or violent exercise of the voice in speaking, shouting, and singing. 3. Morbid conditions in the larynx, *e.g.*, ulcers or growths; or operations for the removal of the latter. 4. Direct exposure of the front of the neck to a cold draught. 5. General exposure to cold, the larynx being involved either alone or along with other mucous surfaces. 6. Extension from the nose or pharynx, or occasionally from the bronchi. 7. Certain febrile conditions, of which it forms a complication, especially influenza, erysipelas, measles, and typhus fever. 8. Secondary syphilis.

The etiology of certain special forms of laryngitis demands separate notice. *Œdematous laryngitis* generally follows some previous laryngeal disease, but may be due to mere cold; it is also particularly liable to arise from swallowing boiling liquids. This usually happens among the children of the poor, who are fond of attempting to drink out of the spout of the tea-kettle. Laryngeal inflammation complicating erysipelas is prone to be attended with œdema. *Croupous inflammation* has recently been the subject of much discussion. French writers have always regarded this variety as identical with *laryngeal diphtheria*, and therefore as always resulting from contagion or bad hygienic conditions. Dr. George Johnson has come forward in support of this view, towards which Sir W. Jenner is also inclined. The general belief, however, is that there is a distinct form of croupous laryngitis, having no connection with diphtheria, but due to exposure to cold, especially to northerly or north-easterly winds, or to a general chill. Occasionally it sets in as a secondary complaint, in the course of some of the exanthemata, viz., small-pox, measles, scarlatina, typhus or typhoid fever, or erysipelas.

tissues. In low fevers gangrene may occur.

The special character of croupous or plastic laryngitis
face of the mucous membrane becomes covered to a
with a croupous exudation or deposit, or so-called “fal
the epithelium being destroyed. This may be limited t
tion of the surface or to separate patches, or it may cover t
larynx and trachea, occasionally extending even into the s
Its main seat is said to be the trachea. In thicknes
from a mere film to two or three lines or more. The con
but it is generally tolerably tough, compact, and adhere
finally becoming detached. Its under surface frequently
points of extravasation. A fresh deposit not uncommo
the membrane is separated, and this may be repeated
Under the microscope it is seen to consist of an amor
fibrillated substance, in which abundant young cells
There is very little swelling of the mucous membrane as
structure is not at all affected.

When death results from acute laryngitis, especially
the following morbid conditions are generally found, viz., t
gestion and œdema of the lungs; lobular or lobar pneum
emphysema and collapse; distension of the heart and
with dark blood; congestion of organs; and slight se
The lymphatic glands beneath the thyroid body on ea
trachea may be enlarged.

SYMPTOMS.—The clinical history of acute inflammatic
air-tube differs in the several varieties, and therefore eacl
rate consideration.

1. ACUTE CATARRHAL LARYNGITIS AND TRACHEITIS
AND TRACHEAL CATARRH. CYNANCHE LARYNGEA.—T
sumes very different degrees of severity, but the followin
symptoms :—Unpleasant sensations are experienced ove

difficulty, this finally becoming more abundant and muco-purulent. Respiration is not much interfered with in ordinary cases.

Laryngeal catarrh occurring in young children is liable to be attended with far more serious symptoms, owing to the small size of the air-tube; to the edges of the glottis being glued together by viscid secretion; and to the tendency to spasm. There can be no doubt but that this is the condition present in a large proportion of cases of so-called "croup," constituting what has been termed "stridulous laryngitis" or "false croup." Breathing is much obstructed and stridulous, and all the croupy symptoms to be presently described may be present.

In some cases of catarrhal laryngitis there are no general symptoms, but usually more or less pyrexia is observed. In children there may be the ordinary signs of blood-poisoning from apnœa.

2. Œdematous Laryngitis.—Œdema may supervene very rapidly, and in the course of an apparently slight attack of laryngeal catarrh. It is a highly dangerous condition, and if not relieved may cause speedy suffocation. The characteristic features of œdematous laryngitis are a sensation of the presence of a foreign body; more marked dysphagia; with urgent dyspnœa of laryngeal characters, inspiration being whistling or hissing, but expiration being comparatively or quite easy. Voice is completely lost, and cough becomes aphonic. It is usually believed that spasm of the glottis aids in the causation of dyspnœa, but some are of opinion that the muscles are paralysed.

The general symptoms are indicative of more or less grave interference with the respiratory functions, and consequent deficient blood-aëration.

3. Croupous or Plastic Laryngitis. Membranous Croup. True Croup. Cynanche Trachealis.—An attack of *idiopathic* or *primary* croup is frequently preceded by some premonitory symptoms for a day or two, such as slight harsh cough and hoarseness, sore-throat, with some pyrexia and constitutional disturbance. In some cases, however, the disease comes on suddenly, and without any previous warning. The attack usually sets in during the night, while the child is asleep, and when established the symptoms are very characteristic.

Local. The voice is at first harsh and hoarse, or at times cracked and shrill, finally becoming whispering or completely lost. Paroxysms of spasmodic, "croupy" cough come on, short, sharp, and abrupt in character, dry, of high pitch, and somewhat metallic, clanging, or brassy quality. The cough is interrupted by a shrill, ringing, whistling, or "crowing" inspiration. Soon it becomes husky and muffled, and at last loses all sound. Respiration is greatly impeded, and presents some peculiar characters. The act is exceedingly laboured and attended with violent efforts; it is also prolonged, and therefore not frequent; inspiration is accompanied with a high-pitched, metallic, sibilant, or wheezing stridor, which may be heard at some distance off.

These symptoms are not persistent, but there are intervals of complete or comparative ease, especially during the day. In severe cases, however, or in the advanced stage of those tending towards a fatal issue, there may be scarcely any remissions. The paroxysms of dyspnœa are commonly believed to be partly caused by spasm of the muscles, but Niemeyer argued that these are paralysed.

The child often grasps its throat or puts its hand to its m
remove some obstruction, and if old enough may complain
A little thick viscid mucus is sometimes brought up by
in some cases flakes or larger patches or even a cast
which may be followed by temporary or permanent relief.
is sometimes difficult.

General. At first the general symptoms are febrile, and
ture may rise to 102°—103° or more, the pulse being freq
hard. Subsequently, however, the pyrexia abates, and i
the prominent signs are those associated with imperfe
blood, which are intensified during the paroxysms. Ulti
cases gradual or rapid suffocation ensues, attended with t
of apnœa. Pulmonary complications frequently arise ar
danger.

Secondary croup may set in during the course of the di
mentioned, giving rise to more or less severe symptoms re
met with in primary croup.

PHYSICAL EXAMINATION.—Examination of the throat
touch may reveal the condition of the epiglottis, should
swollen; and also the presence of œdema. Auscultation
pipe may detect changes in the laryngeal breath-sound, o
râles; or sometimes in croup a peculiar rhonchus name
ment," which is heard during inspiration and expiration,
to be due to the flapping of a piece of false membrane;
sound can be produced by thick mucus. The laryngosc
applicable, especially if the epiglottis is much affected, a
croup; when it can be employed, it might reveal brig
gidity, swelling, œdema, or alteration in shape of various
presence of thick secretion or croupous deposit. Exam
chest indicates more or less interference with the entra
the lungs in cases of œdematous or croupous laryngitis, e
children are affected. The pulmonary sound may be
loud laryngeal sound, and mucous râles are sometimes
chest. Pulmonary complications give rise to their own s
signs.

COURSE, DURATION, AND TERMINATIONS.—The course
simple laryngeal catarrh varies considerably. Recovery i
mination, but the affection is very liable to recur, or may b
Œdematous laryngitis is often fatal, and death may take
denly or with great rapidity. Croup in children usuall
tent course, exacerbations occurring during the night; o
continuous. Some cases terminate within twenty-four h
end within five days; they may go on, however, for ten
night. The clinical terminations are in death or rec
generally results from apnœa, but may be due to asthe
is indicated by the subsidence of the local and general
the same time the cough becoming looser, with more al
purulent expectoration, or sometimes a quantity of exud
pelled.

DIAGNOSIS.—The diagnosis between throat and lary
has already been pointed out when describing the forme

:e laryngeal inflammations have to be distinguished from hooping-
gh ; bronchial catarrh with a tendency to spasm ; diphtheria ; as
as from other conditions affecting the larynx itself, viz., laryngismus
lulus ; acute exacerbations in connection with chronic diseases,
ı as morbid growths ; the presence of foreign bodies ; or external
ry. Only diphtheria and laryngismus can be specially noticed here,
it is important to insist upon carrying out a thorough physical ex-
nation in all cases. Diphtheria extending to the larynx may be
erally diagnosed from laryngeal inflammation by the following
racters :—1. The complaint may be epidemic, or a history of con-
on may be traced. 2. Premonitory general illness may have been
for some days, with tendency to asthenia. 3. Marked throat symp-
s are usually present, preceding the laryngeal symptoms. 4. The
ıds about the jaws are enlarged. 5. Epistaxis and albuminuria fre-
ntly occur. 6. Laryngeal symptoms are not so urgent. 7. Exami-
on of the throat reveals the diphtheritic deposit. Laryngismus
lulus is more sudden as regards the onset and cessation of the
xysms of dyspnœa, and these are often brought on by some obvious
se. A history of previous similar attacks can generally be obtained.
re may be signs of general convulsions, with turning in of the
nbs. The characteristic cough of croup is not present, but the
d often cries. There is complete restoration between the paroxysms.
exia is absent.

t is necessary to distinguish between the different forms of laryngitis.
yngeal catarrh is most common in adults ; has less severe symptoms,
no croupous cough, but more abundant expectoration ; there is but
pyrexia ; much nasal catarrh is often present. Œdematous laryn-
is rare in children, except as the result of drinking boiling water.
enerally supervenes upon some previous disease of the larynx. Ex-
tion is comparatively easy. Cough soon becomes completely
onic, and voice is lost. The œdematous parts may be seen or felt.
by no means easy in many cases to recognise the nature of an in-
ımatory croupy attack in children. Catarrhal laryngitis may, how-
, be often distinguished from true croup by the fact that the patient
ubject to similar attacks in cold seasons ; while the symptoms are
severe and more remittent ; and the termination is rarely fatal. The
ulsion of false membrane is a certain indication of croupous laryn-
. Laryngoscopic examination might afford some aid in the diagnosis
he several forms of laryngeal inflammation.

'ROGNOSIS.—All forms of laryngitis are to be regarded as serious.
œdematous variety is very grave, especially that form which is due
the swallowing of boiling liquids. Croup is a most fatal disease.
prognosis is worse in young infants ; and is more dangerous in pro-
tion to the severity and persistence of the local symptoms, the
ree of interference with respiration, and signs of blood-poisoning.
ly treatment gives a better chance of recovery.

'REATMENT.—There are certain general matters which it is essential
ttend to in the treatment of all the varieties of acute laryngeal in-
ımation. The patient should remain in a warm room, the tempera-
being kept uniformly at 65° or higher, and the air rendered moist
neans of steam. In the case of children it is advisable to make a

tent over the bed, as described under diphtheria, and it may be
sary to raise the temperature of the air considerably. All e
must be avoided, the throat and chest being warmly covered. I
the larynx is imperative, so far as it can be obtained, and in man
it is requisite to urge patients to restrain cough as much as possi

In the case of adults the assiduous employment of inhalat
steam is one of the chief measures to be adopted, and Dr.
Mackenzie recommends the addition of some tincture of benzoi
or conium juice to the boiling water, or a few drops of chlo
occasionally if there is much spasm. If the attack results from
it is desirable to excite diaphoresis by means of warm drinks, a
vapour-bath, and external warmth. The diligent employment
applications over the front of the neck is useful, such as a
dipped in boiling water and then squeezed dry. Some prefe
applications. If the inflammation is advancing, and especially if
spread from the throat, it is recommended to apply directly and effi
a solution of some astringent, either with a brush or sponge, or
aid of an atomizer. Nitrate of silver, alum, tincture of iron, chlo
zinc, and tannin are the substances chiefly employed. In some
an emetic of sulphate of zinc at the outset is decidedly useful, b
former practice of giving repeated depressing emetics, bleeding,
ing, and administering calomel is most objectionable. Occasio
might be advisable in severe cases to apply a few leeches over the
part of the sternum.

The bowels should be kept freely opened, and a diaphoretic
mixture given. If there is much unnecessary distressing cough
sedative may be administered with due precautions, such as a few
of tinct. camph. co. or liq. morphiæ.

The treatment of children must be similar, whatever the nature
inflammation may be, and it is necessary to be very prompt in att
to the first indications of anything wrong with the windpipe in su
jects. A warm bath should be employed immediately, and the
be then dried and wrapped up in blankets, while hot sponges a
stantly applied to the throat. The persistent use of cold com
has been advocated, and is certainly deserving of more extende
If the symptoms are at all severe, unquestionably great relief oft
lows the action of an emetic, though Niemeyer affirmed that "t
only indicated where obstructing croup-membranes play a part
ducing the dyspnœa, and when the child's efforts at coughing are
cient to expel them." Tartar emetic and ipecacuanha are prefe
many practitioners, and may be given to robust children, but s
of zinc or copper answers best in weakly subjects.

Bleeding has been extensively practised in croup, but it shou
be had recourse to as a mere routine measure. Leeches are oft
ful in the case of healthy plethoric children at an early period, es
if there are signs of local blood-stasis. They are best applied o
upper piece of the sternum, the number being regulated accor
circumstances. Notwithstanding the high authority by whi
regular administration of calomel is supported, I have never se
good result from it in this disease, but have more than once k
do a great deal of harm, and therefore feel obliged to express my

objection to its employment. It may be advantageous to give one dose of this drug as a purgative at the commencement. The bowels should be kept freely open, and for this purpose enemata answer best. It is difficult to determine what internal remedies are most serviceable in the treatment of laryngeal inflammation in children, but it has appeared to me that most benefit is derived at first from salines with small doses of tartar emetic or ipecacuanha wine. The cough must be rather encouraged than checked, unless it is unduly severe, and therefore sedatives are generally contra-indicated. Later on stimulant expectorants are required, such as ammonia with chloric ether and syrup of squills. Some recommend the administration of alkaline carbonates or chlorate of potash. Dr. Ringer employs tincture of aconite.

Counter-irritation is not attended with much benefit, but Dr. Squire considers the application of tincture of iodine to the sides of the neck of some service, especially if covered with water-dressing.

The dieting is often of much importance. At first the food should consist chiefly of milk, with cooling drinks, but nourishing soups or meat-juices are required when the system shows any signs of failure. Alcoholic stimulants are not usually needed unless there is some pulmonary complication. If nourishment cannot be taken, it may be necessary to have recourse to nutrient enemata.

The question of *tracheotomy* is in many cases one of the greatest moment. It seems to me that if the symptoms increase in gravity in spite of treatment, and if signs of apnœa set in, the operation ought to be performed without delay, as affording the only chance of recovery, due care being taken both in its performance and in the subsequent treatment.

For œdematous laryngitis the remedies are emetics which act with rapidity; the constant sucking of fragments of ice; efficient scarification; or, in case of need, tracheotomy.

Secondary croup calls for the administration of stimulants and abundant nutriment. Tincture of steel and mineral acids are the most efficient medicines in this affection.

Complications must be treated as they arise. Signs of apnœa must be combatted by the usual measures. It is necessary in cases of recovery to exercise great care during convalescence. As prophylactic measures in those subject to croup, cold washing of the throat and chest, with dry friction afterwards; the wearing of proper clothing; and the avoidance of cold damp winds and night air, are the chief things to be attended to.

II. CHRONIC LARINGITIS.—CHRONIC LARYNGEAL CATARRH.

ETIOLOGY.—This affection may arise as a sequel of acute laryngitis, but its chief causes are:—1. Excessive use of the voice, as in speaking, shouting, or singing. It constitutes the chief morbid condition in "clergyman's sore throat." 2. Phthisis and syphilis. 3. Irritation extending from the throat. 4. Some local irritation in the larynx, especially from ulcers and growths; and also external pressure upon this tube. 5. Irritation of the recurrent nerve. 6. Habitual inhalation of irritant small collections of mucus or more abundant secretion. or *follicular* laryngitis, which is the condition present man's sore-throat," the morbid changes are chiefly confine mose glands of the larynx, these being enlarged and red. the air-tube may be much dilated or contracted, particular and syphilis, its various parts being in some cases much alt and appearance, and its surface uneven. Erosions and ul common. Sometimes hæmorrhage occurs. In phthisis a ch of one or both ary-epiglottic folds is often observed, which monic. They look like pale, solid, pyriform enlargemen ends lying against each other in the middle line, and th directed upwards and outwards.

SYMPTOMS.—In many cases unpleasant and irritating s experienced in the larynx, which are worse after speaking, not usually marked. Alterations in the voice constitute portant and not uncommonly the only symptom of this di is more or less weakened to complete aphonia: often hoar deep-toned, or cracked. It is subject to variations, and i cases frequently improves if the patient speaks for a time. in the voice may only be noticed during loud talking. Parox modic cough cause much distress in some cases, but this sym completely absent. Many patients have a short, tickling c hawk frequently, in order to clear away viscid secretion. Th be hoarse, cracked, barking, or aphonic, and is sometimes a much expectoration. Breathing is only disturbed when th thickening of tissues or œdema, with consequent narro larynx, and then there may be considerable dyspnœa, wi inspiration. A little dysphagia is sometimes experienced.

The laryngoscope reveals the precise appearances pres larynx, and may show that the muscles of the glottis do perly. Sometimes mucous râles may be heard with the ste

There are no general symptoms directly due to chron

onic laryngitis. 3. Variolous, resulting from small-pox pustules.
rs in connection with typhus and typhoid fever, which generally
xtensively and deeply. 5. Phthisical or tubercular. Laryngeal
ı phthisis do not by any means always originate in tubercle.
they are minute and circular at first, being often observed at
k of the ventricular bands, and on the under surface of the
s; by their union they give rise to large and irregular ulcera-
ıich may spread extensively. Sometimes ulceration begins on
.l cords. Generally it does not cause deep destruction of tissues,
ay do so. The epiglottis is often eroded at its margins, and its
may be exposed or perforated. Calcification and necrosis of
lages not unfrequently follow phthisical ulceration. 6. Syphilitic.
ıally secondary syphilitic ulcers are met with, which are limited,
al, and may occur in any part. Tertiary ulcers exhibit a special
y to begin on the epiglottis; they spread rapidly, both in extent
th, causing great destruction of tissues, and presenting irregular
dges. In some cases the ulceration invades upon the larynx
throat; it may originate in the breaking-down of gummata.
ıes it extends at one part, while cicatrizing at another. The
ve a great tendency to contract and narrow the calibre of the
or cause adhesion and distortion of structures. 7. Cancerous.
re very rare.

TOMS.—In the slighter cases there are often no special symptoms;
same remark applies to those ulcerations which are associated
acute fevers.

ıl sensations may be felt in the larynx, of a burning, smarting,
ing character, increased by coughing or speaking; with tender-
pressure. Deglutition is difficult or painful if the epiglottis is
l, especially as regards liquids. The voice is often altered in
being harsh, hoarse, or cracked, as well as weak. Suffocating fits
ı are common, and pus, blood, or laryngeal tissues may be expec-
Breathing is frequently noisy and of laryngeal characters, and
ıy be urgent dyspnœa. In many cases the throat is simultane-
ffected. Cicatrization of an ulcer may give rise to signs of
nt stricture.

IV. Morbid Growths in the Larynx.

bnormal growths and tumours which may be found in the larynx
er *malignant* or *non-malignant*. The *malignant* growths in-
-1. Epithelial. 2. Encephaloid. 3. Scirrhus. All are very
thelial being the most common, and they usually extend to the
rom other parts. The *non-malignant* comprise:—1. Syphilitic
mata and mucous tubercles. 2. Papillomata. 3. Mucous polypi
cellular tumours, either pedunculated or not. 4. Fibrous tumours
ıi. 5. Cystic growths. 6. Lipomata. 7. Erectile vascular
. 8. Enchondromata. 9. Hydatids. Those last-mentioned
xtremely rare occurrence.

TOMS.—The size, situation, number, and nature of the morbid
, as well as the size of the larynx, will necessarily influence the
nptoms. Rarely is there any pain, but occasionally a feeling of

severity, but tend to become more frequent, longer, and more intense as the case progresses. Ultimately death from suffocation not unfrequently occurs during one of the attacks.

The spasmodic affections in adults do not call for particular remark. Hysterical cough is believed to be sometimes due to a spasmodic tendency in the adductors of the cords during expiration; and the sharp ringing cough which occasionally affects children is supposed to have the same cause, the spasm being reflex (Morell-Mackenzie).

DIAGNOSIS.—The only affection likely to be mistaken for laryngismus is inflammatory croup, and the diagnosis between them has already been pointed out.

PROGNOSIS.—Most reflex cases recover, but those due to other causes are very serious. Much will depend upon the state of health of the child, and the severity and frequency of the fits.

TREATMENT.—During a paroxysm of laryngismus in children, measures must be immediately adopted for the relief of the spasm. Slapping or rubbing the back; shaking the child; dashing cold water in the face; fanning; tickling the throat so as to excite vomiting; a warm bath alone or with cold douching while in it; and holding ammonia to the nostrils, are the most effectual measures. A rapid emetic is useful if it can be taken; and if the attack persists, enemata of assafœtida or valerian may be employed, sinapisms being also applied to the chest. Artificial respiration is sometimes serviceable. At the same time it is most essential to seek for any source of reflex irritation and remove this; for instance, lancing the gums often gives speedy relief. In prolonged cases inhalation of chloroform may be carefully tried, and sometimes it is necessary to have recourse to tracheotomy, which may be performed even after apparent death.

During the intervals it is important to look to the diet; to the state of the alimentary canal; and to the general health; improving these if required. Tonics, change of air, and salt-water bathing often do much good.

In adults the main indications are to remove the cause of any spasm; and to use sedative inhalations.

3. LARYNGEAL PARALYSIS. PARALYSIS OF THE MUSCLES OF THE VOCAL CORDS.—Paralysis of the muscles of the larynx may arise:— 1. As the result of some local organic mischief, past or present. 2. From pressure upon or traction of the pneumogastric or recurrent nerves, one or both, by tumours, enlarged glands, &c. 3. After diphtheria; and, rarely, after typhus or intermittent fever. 4. In connection with hysteria, especially if there is much debility. 5. From chronic poisoning by lead or arsenic. 6. Very rarely from centric disease in the brain or upper portion of the spinal cord. 7. As a consequence of atrophy and degeneration of the muscles.

VARIETIES AND SYMPTOMS.—Four chief varieties of laryngeal paralysis are described, viz.:—

(i.) *Bilateral paralysis of adductors—Hysterical* or *functional aphonia.* Voice is lost, but cough is usually attended with sound. The patient sometimes speaks in a scarcely audible whisper. The laryngoscope shows that the vocal cords remain apart, either partially or entirely, during attempted phonation; and they may be perfectly motionless.

Unilateral paralysis of adductors. Voice is altered, and there e a permanent falsetto. The sound produced during coughing, ng, or laughing, is usually much changed and weakened. The oscope reveals that one cord does not act when the patient attempts eak or cough, and that it is generally congested. This form of sis is usually due to some direct cause acting upon the supplying

) *Bilateral paralysis of abductors.*—Here the prominent symptom is œa, with noisy, stridulous inspiration, always present more or less, bject to severe exacerbations, especially after exertion or on making p inspiration. Voice is not much affected, but may be harsh. goscopy discloses that the cords lie close together near the median nd do not separate when an inspiration is made. Some consider his is the pathological condition in laryngismus stridulus, and not

) *Unilateral paralysis of the abductors* is attended with some œa and noisy breathing; and the affected cord does not move g breathing, but remains near the median line.

some cases both sets of muscles are involved, there being a com-on of the symptoms and signs described above, which is usually se in connection with pressure on the recurrent nerves. In rare ces, only a single muscle is paralysed, and then the voice may y be somewhat altered, being mono-toned, or some notes not capable of production.

General Diagnosis, Prognosis, and Treatment of Chronic Laryngeal Affections.

agnosis.—When symptoms indicate some chronic disorder in con-n with the larynx, the diagnosis has to be made between :—1. functional disturbance. 2. Pressure or irritation affecting the air-directly or its nerves. 3. Organic disease, of which, if present, it uisite to determine as accurately as possible the nature, seat, and t. The chief points to be taken into consideration are :—1. The nal and family history of the patient, as revealing any constitu-diathesis. 2. The existing evidence of constitutional disease, ially phthisis, syphilis, or cancer; or of a hysterical condition. 3. The local symptoms present, particularly as regards respiration and . 4. Whether any signs of phthisical disease of the lungs can be vered on careful physical examination, or if such examination ls any morbid condition which might affect the windpipe or its s. 5. The results of laryngoscopic examination. Of course it is by the employment of this instrument in a satisfactory manner that ve and accurate information can be obtained.

ognosis.—All organic laryngeal affections are troublesome, and some m highly dangerous, especially extensive ulceration ; great thicken-f tissues; destruction of the cartilages ; and certain morbid growths, ch as cannot be removed. The danger is in proportion to the e of interference with breathing, and the liability to spasm. In cases there is no fear of a fatal result, but the prognosis as

regards the restoration of the functions of the larynx is unfav
Much will depend upon the constitutional condition. Syphilitic
may often be rapidly cured under proper treatment. Laryngeal
is very serious and intractable as a rule. Cancer is necessari
With respect to the functional disorders, paralysis of the addu
favourable as a rule; that of the abductors very unfavoura
patient being in great danger. The cause of the paralysis wi
sarily influence the prognosis.

TREATMENT.—Rest to the larynx as far as possible; a dry atm
of warm and uniform temperature; the removal of all causes
irritation; the stoppage of any injurious habit, such as excessi
ing; and the wearing of sufficient warm clothing over the n
chest, are the principal general matters requiring attention in
ment of any organic laryngeal disease. In some cases a c
climate is imperative, if it can be obtained; but if not, a
should be worn, at the same time damp, cold, and especially
being avoided.

Constitutional treatment is often of great importance, esp
syphilitic and phthisical affections. In many cases of chronic
tonics are useful, or treatment directed to the alimentary canal
German waters and those of the Pyrenees are recommended in
cases. Sometimes deglutition is much affected, owing to the
of the epiglottis, especially in laryngeal phthisis, and then
attention is required as regards the feeding of the patient, c
taken that a sufficient quantity of nutriment is consumed. I
in these cases to thicken liquids with corn-flour or arrow-roo
times the food must be administered through an œsophageal t
enema.

Local treatment is, however, in most cases that requiring th
tention in laryngeal diseases. Remedies are best applied by
a camel's hair brush attached to a bent handle; inhalation or
inhaler; or by blowing in powders. Lozenges are very use
throat is affected at the same time. The applications should
effectually, regularly, and as frequently as each individual
require, the laryngoscope mirror being made use of to give li
chief substances employed are—1. Mineral astringents and
viz., nitrate of silver; chloride, sulphate, or acetate of zinc;
chloride of aluminium; perchloride of iron; sulphate o
2. Vegetable astringents, such as tannin or kino. 3. Volat
lating liquids in inhalations, viz., creosote, carbolic acid, oil o
juniper. 4. Sedatives in inhalations, especially conium, ti
benzoin, ether, or chloroform. Glycerine is the best solvent
remedy is applied with the brush. Different applications are
in different cases, but Dr. Morell-Mackenzie finds chloride of
of the most useful mineral astringents in chronic laryngitis.
very valuable in phthisis; and nitrate of silver in syphilitic ulc

As regards growths, these necessarily require removal by
Evulsion is the chief method of operation usually; but it is n
enter into any description, as only those who have had co
practical experience would be likely to undertake it. Even c
sometimes be removed with temporary benefit. Caustic reme

no value, except for the destruction of condylomata. The galvanic cautery has been employed in the treatment of laryngeal growths.

Not uncommonly *tracheotomy* is called for in order to prevent suffocation, in cases of extensive ulceration, morbid growths, or great thickening and contraction, and the results are sometimes very satisfactory. Subsequently it may be desirable to remove a growth by dividing the thyroid cartilage.

In all cases where there is liability to laryngeal disease, every precaution must be taken to guard against its development. In phthisis the least indication of any laryngeal irritation should lead to prompt treatment.

For laryngeal functional disorders general treatment is often indicated. All obvious causes of irritation must be removed if possible. Local Faradization is the great remedy in paralysis of the adductors, one pole being placed over the thyroid or cricoid cartilage, and the other in contact with the vocal cords. Paralysis of the abductors usually requires tracheotomy in order to avert suffocation.

CHAPTER VII.

DISEASES OF THE BRONCHI.

1. ACUTE BRONCHIAL CATARRH. ACUTE CATARRHAL BRONCHITIS.

ETIOLOGY.—*Predisposing causes.* These are:—Early or advanced age; indulgence in relaxing and enervating habits; immoderate clothing of children; debility from any cause; the presence of constitutional disease, *e.g.*, rickets, tuberculosis, gout; chronic pulmonary affections or previous attacks of bronchitis; cardiac affections or other conditions which induce overloading of the bronchial vessels; a cold and damp climate or season, especially if liable to sudden changes of temperature; occupations involving exposure, rapid changes in temperature, or the breathing of irritating particles; and residence in the poorer and unhealthy districts of large towns.

Exciting causes. 1. In the great majority of cases bronchitis results from "taking cold" in some way or other, such as by exposure to cold and wet, sitting in a draught when perspiring, sudden change in temperature, wearing damp or insufficient clothing, or sleeping in a damp bed. Undoubtedly many children suffer in consequence of the legs and lower parts of the body being so often left unprotected. 2. Direct irritation of the bronchial mucous membrane is another frequent cause, by very hot or cold air; irritant gases; mechanical particles in the inspired air, *e.g.*, cotton, wool, dust, steel; blood; irritating secretions; or morbid growths, *e.g.*, tubercle and cancer. 3. Blood-poisoning may induce bronchial catarrh, as in various fevers, especially typhoid and measles; gout, rheumatism, or syphilis; after the sudden disappearance of acute

or chronic skin affections, or the suppression of habitual dis
during the administration of certain medicines, especially
Bronchitis occurs epidemically associated with influenza.

ANATOMICAL CHARACTERS.—The morbid appearances c
cating bronchial catarrh are redness, varying in its hue and a
swelling, opacity, relaxation, and loss of consistence of
membrane; at first dryness of the surface, soon followed,
excessive secretion, which changes in its characters as the cas
consisting at first of clear frothy mucus, but afterwards bec
opaque and viscid, muco-purulent or purulent, owing to the
of cells; often epithelial abrasions, or even slight ulcerati
sionally blood is present in the tubes; or fibrinous particles

The appearances will necessarily vary considerably acco
extent, severity, and stage of the disease. The redness is n
towards the upper part of the lungs, and at the bifurca
bronchi, but is rarely perceptible beyond their fourth or fi
and it may disappear after death, owing to the contraction
cular and elastic fibres. The inflammatory products are m
towards the bases, and in the dependent parts of the lungs;
cumulation in the air-cells and minute bronchi they someti
to yellow spots near the surface, especially in children. B
usually affected, but to an unequal degree.

As complications associated with bronchitis the chief c
served are pulmonary congestion and œdema; lobular or m
collapse; acute emphysema or insufflation; lobular or
pneumonia; and pleurisy. The venous portion of the
over-loaded with dark blood. The bronchial glands are o
and enlarged.

SYMPTOMS.—It will be necessary to allude to certain va
acute bronchitis presents in its clinical history, but in a ge
local symptoms may be summed up as:—unpleasant or p
tions in the chest; interference with breathing; cough, wi
tion of the materials formed in the tubes. More or le
almost always present; and in some cases there is a tend
cation, from blocking up of the bronchial tubes; in others
symptoms.

I. PRIMARY OR IDIOPATHIC BRONCHITIS.—1. *Involvi
and medium-sized tubes.* When due to a cold the compla
ushered in by coryza, sore-throat, and some hoarseness;
slight shiverings, alternating with a sense of heat; gener
languor; drowsiness with restlessness; furred tongue, a
constipation. Occasionally slight delirium is observed
young and weakly children convulsions may occur. The
the established disease are local and general.

Local. Subjective sensations of heat, burning, rawn
tickling, or actual pain are experienced to a greater or les
the front of the chest, but especially behind the upper
sternum and in the supra-sternal notch. These are incre
inspiration, and a cough often gives rise to much tearing
may be tenderness over the sternum. Muscular pains a
the result of cough, especially towards the sides and base

A sense of oppression, weight, or tightness in the chest is felt, and respiration may be somewhat hurried and laborious, but there is no evident dyspnœa. Cough is a prominent symptom, being due at first to the irritable condition of the membrane, and subsequently to the secretions in the tubes. It is paroxysmal, often irrepressible and violent, especially on lying down and waking up in the morning. Expectoration soon occurs, the sputa consisting at first of a little clear, thin, frothy mucus; but afterwards increasing in quantity and becoming muco-purulent, more or less opaque, viscid, and scarcely aërated. Sometimes they are very tenacious and adhesive or ropy, and may form distinct "nummulated" masses. As they alter in their characters they are more easily expelled. Occasionally the expectoration is streaked with blood. Under the microscope epithelial cells, numerous young cells, exudation- and pus-corpuscles are the chief elements observed; with abundant granular and molecular matter; and sometimes a few blood discs, fibrinous coagula, or crystals.

General. If the bronchitis is at all extensive, a certain degree of fever is present, but it is never very marked. The patient frequently feels very languid and weak. Other mucous surfaces are often the seat of catarrh.

2. *Bronchitis extending into the minute tubes.—Capillary Bronchitis.* In most cases this form is but an extension of that already described, being preceded by its symptoms, but sometimes the smaller tubes seem to be affected at the same time as the larger or quite independently, and then well-marked rigors may occur at the outset, with headache and vomiting. The peculiar features of capillary bronchitis are as follows:—1. Pain is often slight or absent, except the muscular pains resulting from cough, which are very severe. 2. Respiration is always greatly disturbed, being accelerated sometimes to 50 or more per minute, wheezing or crepitous, attended with effort and with a considerable sense of want of air. The pulse-respiration ratio is altered, being in some instances about 2·5 to 1. Urgent dyspnœa is observed in severe cases, either constant or paroxysmal, which may amount to orthopnœa. 3. Cough is exceedingly frequent and violent, and during the act patients often sit up or bend forward and hold their sides. 4. Expectoration is very difficult, the sputa being abundant, usually viscid and tenacious, containing also minute fibrinous casts of the tubes. 5. The general symptoms are of an aggravated character, there being at first considerable fever, the temperature occasionally rising to 103° or more, with much exhaustion and weakness. The urine sometimes contains a little albumen or a trace of sugar. As the case advances, the tendency is to the development of the usual symptoms indicating suffocation and venous congestion, usually gradual in their onset, occasionally rapid or sudden owing to the filling up of the tubes, the cough diminishing, the breathing becoming shallow, and the expired air cool. In some instances, however, typhoid symptoms set in; or there may be a combination of both classes of phenomena.

It is necessary to allude to some individual peculiarities. Children are very liable to show signs of deficient blood-aëration, even in the slighter cases, especially if they are feeble and badly nourished or rickety, because they cannot expel the sputa. They usually swallow these, and therefore in order to examine them it is necessary the base of the tongue with a handkerchief after a cough. adults do not suffer nearly so severely as a rule. In aged pers those who are constitutionally weak from any cause, the fever apt to assume an adynamic type, even though the bronchitis extensive. The term "peripneumonia notha," formerly much emp properly includes cases of capillary bronchitis occurring in old or subjects after some chronic malady, attended with febrile symptom first, but signs of adynamia and deficient aëration of blood setting an early period.

II. Secondary Bronchitis.—This term is applied to bronch occurring in connection with the exanthemata; blood diseases, gout, rheumatism, Bright's disease; or chronic lung or heart affectio In nearly all these conditions it is apt to come on very insidiously, wi out any of the usual symptoms being prominent, and is often a danger complication. The expectoration is said sometimes to contain pecul materials which accumulate in the blood, *e.g.*, uric acid in gout. Lu deposits usually give rise to localised bronchitis. When acute bronchi complicates emphysema and chronic catarrh, especially if associa with cardiac disease, urgent dyspnœa and signs of apnœa are likely set in speedily, with general venous congestion and dropsy; expecto tion is also very abundant and frothy at first.

III. Mechanical Bronchitis.—When due to the inhalation irritant particles, the attacks of bronchitis are frequent but compa tively slight, there being no pain or fever, but an irritable cough but little expectoration, which may contain some of the partic breathed.

IV. Epidemic Bronchitis has been already described in connect with influenza.

It must be remembered that the complications previously mentio may be present, modifying the symptoms as well as the physical si which are now to be considered.

Physical Signs.—1. The chest may be somewhat enlarged f distension of the lungs. 2. Respiratory movements are more or quick, frequent, and deep; expiration is sometimes prolonged; an the tubes are extensively filled the upper part of the chest moves duly. In children signs of inspiratory dyspnœa are very comm 3. Rhonchal fremitus is frequently present, varying in its charact 4. Percussion may reveal increase in extent and degree of pulmon resonance from distension; or occasionally some deficiency of resona at the bases is observed, due to accumulation of secretion, conges and œdema, or collapse. In infants a sound resembling the "bruit pot fele" may be frequently elicited. 5. Respiratory sounds are and harsh with prolonged expiration, where the tubes are free; wh obstructed they are weak or absent, or they may be completely obsc by rhonchi. 6. The various rhonchi, due to the narrowing of the tu or to the fluids contained within them, constitute the important phys signs of bronchitis. They may be of sonorous, sibilant, mucous, mucous, or subcrepitant character, according to the physical condi present, and these often co-exist in different parts of the chest. At the dry râles are only or chiefly heard; while the moist are princip observed towards the bases of the lungs. When fluids collect in the larger tubes, rhonchal sounds may be audible at a distance from the patient. Cough affects them considerably. Occasionally the heart's action may cause râles.

Duration and Terminations.—According to its severity, a case of bronchitis may end in three or four days or go on for two or three weeks or more. Capillary bronchitis generally proves fatal from the sixth to the twelfth day, death occurring earlier in children than adults as a rule. There is always the danger of a relapse or extension of the inflammation. The terminations are :—*a.* In recovery, but in severe cases convalescence may be very prolonged, and cough is liable to remain for some time. *b.* In death, either from gradual or sudden apnœa, or adynamia. *c.* Occasionally by transition into the chronic state. As sequelæ, emphysema, pulmonary collapse, deformed thorax in children, or acute or chronic phthisis may remain.

Diagnosis.—The diagnosis of the diseases of the lungs will be hereafter considered in a separate chapter. At present it need only be remarked that the chief diseases from which acute bronchitis requires to be distinguished are :—hooping-cough; croup and other forms of laryngitis; pneumonia, especially lobular; and acute phthisis. It is of importance to recognise any complication occurring during the course of an attack; and also not to mistake bronchitis associated with one of the exanthemata for the sole complaint.

Prognosis.—Bronchitis is a very dangerous disease, and stands high as a cause of death in this country. The circumstances which increase its gravity are :—Very early or advanced age; a bad state of health, or the existence of some general chronic or acute disease; previous organic mischief in the lungs, especially extensive emphysema, or in the heart; extensive implication of the smaller tubes, with great difficulty of expectoration; signs of accumulation of materials in the tubes, with shallow breathing and cessation of cough, or of their extensive obstruction, the latter being especially looked for in children; urgent dyspnœa, with evidences of apnœa; the presence of adynamic symptoms; the occurrence of complications; neglect of treatment; and a low epidemic type.

Treatment.—Early attention is required in all cases of bronchitis, but especially when children are affected. Confinement to the house or even to one room is advisable, and if the case is at all severe the patient should remain in bed, warmly clad in flannel, avoiding exposure of the chest, the room being kept at a temperature of from 65° to 68°, and it may be necessary to moisten the air with steam. When the attack results from a cold, it is useful at the outset to induce free perspiration by means of copious hot drinks, a warm foot-bath, to which may be added a little mustard, or even a hot-air, vapour, or Turkish bath, the patient then going to bed and lying between blankets, covered with abundant bedclothes. A full dose of Dover's powder may be given, or a saline diaphoretic draught. A sinapism over the chest is useful, and if the larynx is at all involved, steam inhalations should be employed. An emetic at the outset is in much favour with some practitioners in severe cases, and might occasionally be serviceable in the treatment of children.

Should the symptoms not subside the indications are :—I. To subdue the inflammation as soon as possible. 2. To promote the discharge of the materials forming in the tubes, and diminish their quantity if excessive. 3. To relieve unnecessary cough. 4. To allay spasm of the bronchial tubes if present. 5. To pay attention to the constitutional condition, and support the strength if it fails. 6 To treat apnœa, excessive fever, or adynamia, should either set in. 7. To attend to complications.

For fulfilling the first indication, general or local bleeding, tartar emetic, tincture of digitalis, and tincture of aconite are the chief remedies. Venesection is very rarely required or admissible, but moderate local bleeding, by means of leeches or cupping, may be occasionally beneficial, though much discrimination is necessary in adopting this measure. The front of the chest and the posterior base are the sites from which blood may best be taken. The application of two or three leeches sometimes relieves severe dyspnœa in plethoric children very satisfactorily.

Tartar emetic is decidedly valuable in the early stage of severe cases, provided the patient is strong and not too old. It may be given with liq. ammon. acet. and a few drops of tinct. camph. co., in doses of gr. $\frac{1}{4}$ to $\frac{1}{2}$ for an adult. Tincture of digitalis and tincture of aconite have been well spoken of, and are deserving of more extended trial.

The next three indications are carried out mainly by the administration, in various combinations as they are required, of:—*Expectorants*, viz., at first vin. ipecac., tinct. or syrup scillæ, tinct. camph. co.; and later on carbonate of ammonia, chloride of ammonium, infusion of senega or serpentary, ammoniacum, galbanum, or tincture of benzoin; *sedatives* and *narcotics*, especially opium or morphia, henbane, conium, hydrocyanic acid, or chlorodyne; and *antispasmodics*, such as the various ethers, tincture of lobelia, or spirits of chloroform. Each case must be studied carefully, and the remedies varied accordingly. They may be combined with demulcents or diaphoretics. Should the tubes be much loaded and expectoration be difficult, narcotics, particularly opium, must be avoided, and the patient should lie with the head high and be encouraged to cough frequently, not being allowed to sleep for too long a time. It is especially necessary to attend to these matters in the treatment of children. Should there be dangerous accumulation, an emetic of sulphate of zinc is very useful. On the other hand, if there is an irritable cough, it may often be voluntarily repressed by the patient, and sedatives are then most valuable. Inhalations are frequently beneficial, those of conium, ether, chloroform, hop, or benzoin, to relieve cough and check spasm; later on those of tar, creosote, or carbolic acid, to diminish or improve the sputa.

Local treatment is generally called for. Repeated sinapisms, hot or turpentine fomentations, or linseed-meal poultices are beneficial at first; when the acute symptoms have subsided blisters may be useful, or, if there is a tendency to chronic catarrh, some more powerful application may be required, croton-oil liniment being the best. Free dry cupping frequently relieves troublesome dyspnœa and oppression about the chest, especially when acute bronchitis complicates emphysema with chronic catarrh. In these cases flying blisters and turpentine stupes are also serviceable.

The constitutional conditions chiefly requiring attention are general debility, rickets, tuberculosis, and gout. Lowering treatment is not borne when either of these is present. It is quite needless to keep patients on too low a diet, and considerable support is often called for in bad cases. Stimulants are not requisite as a rule, and may do harm, but they must be given if necessary, particularly if signs of adynamia or apnœa set in, their effects being carefully watched. Excessive pyrexia calls for full doses of quinine. Any tendency to asphyxia must be combated by the usual measures.

In the treatment of children one of the best remedies in most cases is ipecacuanha wine in moderate doses every three or four hours. When bronchitis attacks old people or those who are weak from any cause, or when it occurs as a secondary complication, wine or brandy and abundant nourishment are usually required, and a mixture should be given containing carbonate or muriate of ammonia, ether or spirits of chloroform, and tincture of squills, with camphor mixture, decoction of bark, infusion of senega, or ammoniacum mixture. Capillary bronchitis in the majority of cases demands a stimulant and supporting treatment.

Proper precautions must be taken until convalescence is established, especially against cold, damp, and night air; flannel must be worn next the skin. Tonics are often useful during recovery, such as quinine, mineral acids, or iron. Due care must also be exercised in the case of those who are subject to bronchitis, and for such a change to some genial climate during the winter season is very desirable.

II. Chronic Bronchitis—Chronic Bronchial Catarrh.

Etiology.—As a rule chronic bronchitis follows repeated attacks of the acute disease, but occasionally remains after one attack, or begins as a chronic affection. It is frequently associated with gout and other constitutional complaints, chronic lung diseases, heart affections causing pulmonary congestion, chronic alcoholism, or the breathing of irritant particles. Persons advanced in years are far most subject, but even children are liable to suffer.

Anatomical Characters.—When this complaint has been long established, it leads to considerable changes in the bronchial tubes. Their lining membrane becomes dark-coloured, often of a venous hue, or here and there greyish or brownish, and the capillaries are visibly enlarged and varicose. Thickening of tissues; increased firmness, which may amount to much induration; and contraction are observed, with loss of elasticity and muscular hypertrophy. The cartilages may ultimately calcify. The small tubes are narrowed or closed up; the larger being often dilated and gaping on section. The surface of the membrane is uneven, frequently presenting extensive epithelial abrasions, or occasionally follicular ulcers. In some cases there is only a little tenacious mucus in the tubes, but usually they contain abundant muco-purulent or purulent matter, or frothy mucus.

Symptoms.—Numerous varieties are presented in practice as regards the severity and exact characters of the symptoms of chronic bronchial catarrh, depending upon its *extent*, and upon its frequent association with other morbid conditions in the lungs, especially emphysema or dilated bronchi and phthisis; with cardiac affections; or with some constitutional diathesis. Cases of this complaint may, however, be classed under three groups:—

1. In many instances patients only suffer during the cold season, having a "winter-cough;" but after a while the symptoms become permanent to a greater or less degree, being liable to exacerbations in cold and damp weather. A little uneasiness or soreness is often felt behind the sternum, increased by coughing, but there may be none at all. A sense of oppression about the chest, with shortness of breath on exertion, is usually present in severe cases. Cough is the main symptom, occurring chiefly in paroxysms, varying greatly in severity and frequency; it is often very annoying on first going to bed and early in the morning. It is attended with expectoration, the sputa being frequently difficult to expel and abundant, consisting of greyish mucus, yellowish or greenish muco-purulent or purulent matter, or a mixture of these, usually running into one mass, but occasionally remaining in separate lumps, which may be "nummulated." Being but slightly aërated the masses not unfrequently sink in water. Occasionally blood-streaks are observed. Sometimes a most offensive or gangrenous odour is given off, supposed to be due to decomposition of the sputa or to microscopic sloughs. The microscope reveals much granular matter, with imperfect epithelial and pus-cells, and often blood-corpuscles.

Severe cases may be attended with considerable wasting and debility, as well as slight evening pyrexia and night-sweats.

2. *Dry catarrh. Dry bronchial irritation.*—This variety is particularly observed in connection with gout, emphysema, or irritant inhalations: and in sea-side places. More or less dyspnœa with tightness across the chest is felt, and very distressing paroxysms of irritable cough come on, either quite dry or only followed by the expectoration of a small pellet of greyish, pearl-like, tough mucus, compared to boiled starch, or of a little watery fluid.

3. *Bronchorrhœa.* Most frequent in old people, especially in connection with cardiac diseases, this form is characterised by the expectoration being very considerable in amount, sometimes as much as four or five pints in the twenty-four hours; either watery and transparent, or glutinous and ropy, resembling a mixture of white of egg and water, and scarcely at all frothy. The cough is paroxysmal and often violent, but may be insignificant compared with the quantity of fluid discharged. Patients frequently obtain relief from dyspnœa and other unpleasant sensations after a spell of coughing. In severe cases there may be loss of flesh and proportionate weakness.

PHYSICAL SIGNS.—The only signs directly due to chronic bronchial catarrh are:—1. Rhonchal fremitus. 2. Harsh respiratory sounds, often weak, with prolonged expiration. 3. *Sonorous* and *sibilant* râles, with some large *mucous* râles towards the bases, the latter rarely abundant, and varying in characters according to the consistence of the contents of the tubes. Other signs are generally present in cases of long duration, but they are dependent upon emphysema and other morbid changes accompanying the catarrh.

PROGNOSIS.—When chronic bronchitis is confirmed, only rarely can it be thoroughly cured. The chief dangers are that it will become more extensive or induce emphysema, dilated bronchi, collapse, or phthisis; or that an acute attack might supervene, which is often highly dangerous.

Treatment.—From what has just been stated, it is obvious that all cases of chronic bronchitis ought to be thoroughly attended to as early as possible. The patient must be removed from every probable source of irritation and observe due precautions against exposure, wearing warm clothing with flannel next the skin, and if a suitable climate cannot be obtained, it will be well to keep indoors during bad weather, or if obliged to go out to wear a respirator.

It is very important to look to the state of the heart, digestive organs, and general system. If cardiac disease is present, infusion or tincture of digitalis is often very useful. By relieving dyspepsia and keeping the bowels freely open, much good may also frequently be done. Any constitutional diathesis present must be attended to, especially gout, rheumatism, rickets, and tuberculosis; as well as a plethoric or anæmic state of the blood. A great many cases of chronic bronchitis do well under a course of treatment by tonics and good diet with some stimulant, especially if there is abundant expectoration, causing debility and wasting. Quinine, ferruginous preparations, or mineral acids with bitter infusions, are often very valuable, as well as cod-liver oil. In some cases mineral nervine tonics, such as sulphate or oxide of zinc, are beneficial.

Much discrimination is requisite in the employment of remedies more immediately directed against the local complaint. The main indications are to limit excessive secretion; to assist expectoration if it is difficult; to allay irritable cough; and to subdue spasm of the bronchial muscular fibres. The first indication is carried out by the internal administration of chloride of ammonium; balsams and resins, especially balsam copaibæ, ammoniacum, or galbanum; astringent preparations of iron, acetate of lead, mineral acids, tannic or gallic acid; and by employing inhalations of steam with tar, creosote, carbolic acid, or naphtha; or very dilute dry inhalations of iodine, chlorine, balsamic and resinous vapours, or that of chloride of ammonium. The other indications are fulfilled by the same means as are mentioned under acute bronchitis, and similar precautions must be observed as to the use of narcotics, should there be a tendency to accumulation of secretion. If the sputa are very viscid, alkaline carbonates or liquor potassæ may prove beneficial. Sedative inhalations are most valuable if there is irritable cough. Tincture of Indian hemp is sometimes useful if there is much tendency to spasm.

The chest should be covered in front with some warm plaster and cotton wool. Free dry cupping, sinapisms, blisters, turpentine liniment, croton oil liniment, and other local applications are frequently serviceable.

Change of climate or a sea voyage is most beneficial in many cases. All forms of bronchitis require a tolerably warm region, which is not subject to rapid changes of temperature or exposed to cold winds, and situated at a moderate elevation. Dry catarrh needs a soft and relaxing atmosphere, of moderately high temperature. If there is much expecto-

A few observations must suffice for this rare complaint. suffer most frequently, and it is rather more common amo It is supposed to be due to some diathetic condition, and is generally associated with a weak constitution, or sometime culosis.

Anatomical Characters.—A plastic exudation colle tubes, forming whitish casts, varying in size according t affected, as well as in extent; either hollow or solid; and presenting concentric layers. It consists of an amorphous substance, enclosing granular matter, oil-globules, and ce which are nucleated. Some suppose that it is merely al the result of bronchial hæmorrhage, but this is not correct.

Symptoms.—Plastic bronchitis is almost always chronic, acute exacerbations. The symptoms are fits of cough an more or less frequent, severe, and prolonged, being sometim aggravated; followed and usually relieved by the expe fibrinous masses, which on being unravelled under water like casts of the tubes. There may be some hæmoptysis. extensive bronchial catarrh or pneumonia is set up, and pyrexia may be observed. In the intervals patients sufferi complaint often feel quite well.

The physical signs indicate obstruction of the tubes, complete and extensive, leading to emphysema or collapse are often present, especially of a sibilant character, with a râles.

A case came under my notice, in which a tolerably he young man was affected with plastic bronchitis, bringing u of casts almost daily, but who scarcely suffered any inconve

Treatment.—During the attacks of dyspnœa and coug inhalations; the external application of sinapisms, turpenti tions, or blisters to the chest; and the internal administra tives with tartar emetic or ipecacuanha wine might be trie cure of the complaint there is no known remedy. Tonics, change to a warm climate, or a long sea-voyage, seem to b stitial pneumonia. Its immediate causes are supposed to be:—1. Morbid changes in the walls of the bronchi, diminishing their resisting power. 2. Increased pressure of air during cough in parts unsupported; or during inspiration, in consequence of obliteration of a number of air-vesicles, being then compensatory. 3. Persistent pressure of stagnant secretion. 4. Contraction of lung-tissue in connection with chronic pneumonia, the enclosed bronchi becoming dilated in the process.

Anatomical Characters.—The bronchi may be extensively dilated and of a fusiform shape; or present one or more limited globular enlargements. Their size varies considerably. After a time their inner surface becomes irregular, and occasionally ulcerated; they contain a muco-purulent or purulent substance, often fœtid; and gangrene or hæmorrhage sometimes takes place in connection with them. Their contents may ultimately dry up and become caseous or even calcareous; and finally the dilated tubes may become obliterated.

Symptoms.—The only significant symptom of dilated bronchi is the occurrence of severe paroxysms of cough, ending with abundant expectoration, which is discharged with much difficulty, depositing a thick sediment on standing, and being often exceedingly fœtid and containing caseous particles.

Physical Signs.—These are indicative of cavities, viz.:—1. Tubular percussion-sound occasionally. 2. Loud bronchial, blowing, tubular, or cavernous breath-sound, which may be heard after a cough when previously absent. 3. Various moist râles, which may be of hollow character. 4. Loud bronchophony or pectoriloquy.

Treatment.—The chief point requiring attention is to see that the secretions are not allowed to stagnate in the dilated bronchi. The expectoration may be improved and limited by means of inhalations of carbolic acid or creosote.

Chapter VIII.

PULMONARY CONGESTION—ŒDEMA—HÆMORRHAGE.

These morbid conditions may be considered together, as they are in many instances but stages of the same process.

Etiology.—Hyperæmia of the lung may be active, mechanical, or passive. Active congestion results from:—1. Increased cardiac action from any cause. 2. Probably hypertrophy of the right ventricle sometimes. 3. Irritation produced by certain conditions of the air inspired, or by deposits in the lungs. 4. Various pulmonary affections which interfere with the circulation in the capillaries in some parts, in consequence of which those of other parts become overloaded. 5. Inflammatory pulmonary diseases, of which congestion is the first stage, and which it often accompanies. 6. Obstruction to the entrance of air into the lungs during inspiration, and hence rarefaction of the residual air, with diminished pressure on the vessels. The causes of mechanical hyperæmia are:—1. Some cardiac disease in the great majority of cases, interfering with the passage of blood through the left cavities of the heart, especially mitral disease, but probably also a feeble dilated condition of the left ventricle. 2. Very rarely a tumour pressing on the pulmonary veins. Passive congestion is most frequent in low fevers and other conditions which greatly depress the action of the heart and disturb the capillary circulation, especially in the aged and feeble; it is seen chiefly in dependent parts, usually the bases and posterior portions of the lungs, on account of gravitation, and it is then termed "hypostatic." Probably it may also arise in connection with a very weak dilated right ventricle.

Œdema is as a rule the result of long-continued or intense congestion from any cause, but especially when associated with cardiac disease. It may be but a part of a general dropsy.

Hæmorrhage into the lungs may occur under the following circumstances:—1. As a result of congestion. 2. From the lodgment of an embolus in one of the branches of the pulmonary artery. This embolus is usually associated with cardiac disease, and is detached from a clot in the right ventricle, but it may be conveyed from more distant parts. 3. From a diseased condition of the branches of the pulmonary artery; this often materially aids in the causation of pulmonary hæmorrhage. 4. As the consequence of injury to the lungs or chest. 5. From morbid growths, cavities, or ulcers in the lungs. 6. In connection with some morbid condition of the blood, such as that associated with scurvy, purpura, or malignant fevers.

ANATOMICAL CHARACTERS.—Hyperæmia gives rise to a more or less deep-red colour, which may become bluish, purple, livid, or blackish-red. The part affected is enlarged, relaxed, and moist; crepitates imperfectly; and a quantity of aërated bloody fluid escapes on section; pieces float in water. In extreme cases the vesicular structure is scarcely apparent, and the tissue breaks down very readily, this condition of the lung being termed splenification. Hypostatic congestion may end in hypostatic pneumonia.

Œdema is necessarily chiefly observed in dependent parts, and is always present, more or less, when the lungs are congested. The lungs are enlarged, tense, do not collapse when the chest is opened, and have a peculiar feel, retaining the impression of the finger for a time. The tissues are very moist, and on section a large quantity of serous fluid escapes, either red or colourless according as it is associated with congestion or not, and it may or may not be frothy. The lungs are either congested or pale.

Hæmorrhage is described as occurring under four forms, viz.:—1. *Circumscribed* or *nodular; hæmorrhagic infarction* or *pulmonary apoplexy*. 2. *Diffuse*, or *true pulmonary hæmorrhage*. 3. *Interlobular*. 4. *Petechial*, in connection with blood-diseases. The last two are very rare, and do not call for further notice.

Hæmorrhagic infarction is due to embolism, and the blood comes from the capillaries of the pulmonary artery, collecting within the alveoli and minute bronchi as well as outside them, but there is no laceration of tissue. The size of an accumulation varies considerably, depending upon that of the branch of artery obstructed, and it may measure from lf an inch to 4 inches or more in diameter. When in the interior it arge; near the surface small and wedge-shaped or pyramidal, with the e projecting outwards a little beyond the surface. The most frequent s of infarction are the interior of the lower lobes, and about the of the lung, but at the same time there may be others near the ce, and they are often numerous. The hæmorrhages are circum-ed and defined, and may only correspond to a single lobule, but is congestion with œdema around. They feel very firm and hard; tion appearing solid, airless, slightly granulated, dark-red or ish, while coagulated blood can often be scraped away, and then tructure may be perceptible.

oplectic clots in the lungs are liable to the usual changes, and the may ultimately be completely removed, the tissues being restored r normal condition. In many cases a permanent blackish, pig-d knot is left. Pneumonia or abscess is sometimes excited, the ftening in the centre; or it may undergo caseous or calcareous ration and become encapsuled.

he diffuse form of hæmorrhage a vessel of some size gives way, g-tissue being lacerated, and an irregular potential cavity being l, varying in size, and containing a mixture of fluid and clotted The pleura may give way, the blood then escaping into its

few remarks may be made here with reference to a condition as "brown induration of the lung." This follows long-continued tion, especially that due to mitral disease, and it is characterised by umulation of granular yellowish pigment, probably of the nature natoidine, in enlarged epithelial and granular cells, which collect alveoli: with varicose dilatation of the capillaries; and probably ing of the alveolar walls. The pigment may become black, and nally be found free. The lungs are increased in bulk and do not e: feel heavy, compact, and inelastic; and present a yellowish ssing into brown or reddish-brown. On section, in addition to eral change of colour, red spots are seen, shading into black, and nish fluid may be expressed. Various degrees of the change are ed, and the extent of tissue affected differs much, while infarctions en present at the same time.

PTOMS.—These are not easy to define, as they are usually only ations of previously existing symptoms. One of the most obvious ms resulting from pulmonary congestion and its consequences nœa, either coming on for the first time or being more intense fore, sometimes amounting to orthopnœa. A feeling of tightness ession is often experienced across the chest, but pain is generally There is cough, which in œdema is attended with very profuse expectoration; and when hæmorrhage exists, more or less blood ly discharged, which may have a dull-brownish or bister-colour, most black. If a clot excites inflammation, there will be pyrexia er symptoms indicating this complication.

SICAL SIGNS.—1. Movements are often diminished. 2. Per-sound is at first abnormally clear in congestion, but afterwards s more or less deficient. There may be localised dulness in con-with hæmorrhages. 3. Respiratory sounds are weak and harsh;

over the seat of hæmorrhage they may be bronchial. 4. Œdema is characterised by abundant, small, liquid, bubbling râles; localised moist râles may also be perceptible over hæmorrhages, and here signs of pneumonia or abscess may ultimately be set up. 5. Vocal fremitus and resonance may be increased or diminished, but are quite unreliable.

PROGNOSIS.—As a rule these affections are serious, and they increase the gravity of the prognosis considerably when they complicate other dangerous conditions.

TREATMENT.—Much will depend on the exact nature and extent of the morbid changes, and the conditions which cause them or with which they are associated. Free dry cupping of the chest is often very useful, and sometimes local removal of blood is indicated. It is important to attend to position, and to keep the patient at rest. Good diet, tonics, and stimulants are frequently necessary. Care must be taken in œdema that the fluid is not allowed to accumulate in the lungs. In diffuse hæmorrhage astringents are required. Remedies which act upon the heart and vessels may be of much service.

CHAPTER IX.

PNEUMONIA—INFLAMMATION OF THE LUNGS.

INFLAMMATION of the tissues of the lungs occurs under different forms, each of which requires separate consideration.

I. ACUTE CROUPOUS PNEUMONIA. LOBAR PNEUMONIA.

ETIOLOGY.—*Predisposing causes.* 1. Age. Most cases occur between 20 and 30, but no age is exempt, and the young and old are very liable to suffer. 2. Sex. More males are attacked, probably from greater exposure to the exciting causes. 3. Social position, habits, and occupation. Poverty, residence in large towns, intemperance, and occupations involving exposure or over-exertion, predispose to pneumonia. 4. State of health. Pneumonia is very liable to occur in those who are constitutionally feeble, or who suffer from any lowering chronic or acute disease; as well as during convalescence from the latter. 5. Previous attacks increase the liability. 6. Climate and season. Those characterised by coldness, rapid changes in temperature, much moisture, or the prevalence of northerly and easterly winds, greatly predispose to attacks of pneumonia.

Exciting causes. 1. Most cases of *primary* pneumonia arise from a sudden chill when the body is heated; exposure to cold or wet; or a cold draught. 2. Direct irritation not unfrequently sets up pneumonia, which may be due to the inhalation of very hot or cold air, or irritating gases; foreign bodies, such as food; blood, especially apoplectic clots; or morbid deposits, *e.g.*, tubercle, cancer, diphtheritic or croupous exudation. 3. Injury to the chest often excites local inflammation, such as tusion, fracture of the ribs, or perforating wounds. Some are of nion that violent exertion is occasionally a cause, but this is very btful. 4. Pneumonia is frequently *secondary* to various acute affec- s, especially low fevers and blood-diseases, *e.g.*, measles, small-pox, hus, typhoid, pyæmia, puerperal fever. It is also very apt to e in chronic blood-diseases, but in these cases there is some other iting cause, which may be undiscoverable, acting on a depraved tem. 5. Epidemic pneumonia has been described. The complaint y assume this character in connection with influenza or other epidemic eases, especially if there is much over-crowding with deficient venti- ion. It is also said to prevail in malarial districts. 6. Intense or g-continued pulmonary congestion is very liable to cause pneumonia, ecially in connection with heart-disease, or the "hypostatic conges- n" which affects dependent parts in old and weak individuals who are nfined to bed from any cause—*hypostatic pneumonia.*

Some authorities regard primary pneumonia as a "specific fever," of ich the lung inflammation is but a local manifestation.

ANATOMICAL CHARACTERS.—Pneumonia is characterised pathologi- lly by hyperæmia and œdema, followed by the formation of a fibrinous udation in the interior of the air-vesicles and minute bronchi, which dergoes various changes. It is necessary to describe the appearances esented in different stages.

Dr. Stokes has described a *preliminary stage,* characterized by brilliant erial redness, with abnormal dryness, but no other alterations. Those ually seen, however, are as follows:—

First or engorgement stage. External characters. Colour is dark-red, ldish-brown, violet, or livid; not uniform, but mottled. The lung ls heavy, and the affected part is firmer, more resisting, and less stic than in health, retaining impressions of the finger, and not crepi- ing much. On section a quantity of reddish or brown bloody serum apes, more or less aërated, and somewhat viscid. The lung-texture still perceptible, and pieces float in water. Consistence is diminished, tissue being more easily torn.

Second or exudation stage—Red hepatization. External characters. lour is more uniform and dull-reddish. Weight is markedly increased, d the lung is sometimes evidently distended, being marked by the s. The tissue feels solid and firm, absolutely inelastic, and non- pitant. A section is of a dull reddish-brown colour, with some yish variegation, and opaque, but it becomes brighter after exposure. ry little fluid escapes, often none except on pressure, this being ck, dirty, sanguineous, and non-aërated. A characteristic granular pearance is usually visible, especially on tearing the affected part, but is less marked in children, or when the exudation is soft, as in low ers and when the disease attacks old people. All trace of lung-tex- e has disappeared, and its tissue is very brittle, breaking down easily der pressure. Fragments sink in water instantly. The microscope eals amorphous fibrin, with abundant newly-formed cells and some anules.

Third or grey hepatization stage. In this stage the colour gradually les, becoming ultimately grey, with a greenish or yellowish tint; the anular appearance on section is less distinct or lost, and the lung-

tissue becomes more or less soft or pulpy. A quantity of dirty, gr
almost puriform fluid escapes, either spontaneously or on press
scraping. This stage presents all grades, from slight softening t
is termed "purulent infiltration." There is excessive cell-form
with fatty degeneration and liquefaction of the inflammatory pr
In favourable cases these materials are ultimately either absor
expectorated, and the lung tissue remains unaltered in structure.

Such being the ordinary course of a case of pneumonia, other
logical terminations are observed in rare instances, viz.—1. For
of one or more abscesses, which may open into the bronchi and
charged, leaving a cavity; or into the pleura; or become enc
the contents undergoing cheesy or calcareous changes, and c
closure may ultimately take place. 2. Gangrene. 3. Caseous
ration. 4. Chronic induration or cirrhosis.

The *right lower lobe* is the most frequent seat of acute pne
but the inflammation may spread through the entire lung, or
both organs. Sometimes it begins in the middle or upper lobe
the old or cachectic it often extends from above downwards.

The parts of the lungs not pneumonic are frequently conges
œdematous, while more or less bronchitis is present. Pleuriti
tion is commonly observed, but not often abundant effusion. T
cavities of the heart and venous system are overloaded, the
organs being congested, and fibrinous coagula are liable to for
heart and vessels, the blood being exceedingly rich in fibrin, ex
the "buffy" coat markedly.

SYMPTOMS.—In some cases an attack of pneumonia is prec
a short time by premonitory signs, indicating general indis
Primary pneumonia usually sets in very suddenly, the invasio
attended with a single, severe, more or less prolonged rigor.
may be great prostration, with pyrexia; vomiting; or nervous sy
viz., headache, delirium, restlessness, stupor, or, in children,
sions. The special symptoms are *local* and *general*.

Local. Pain in the side is usually complained of, being occ
simultaneous with the rigor or even preceding it, but as a rule s
after a variable interval. Its seat is generally about the n
region, and though considerable it is not very intense, at all eve
long period, being tolerably easily relieved. In character it is co
stabbing or piercing, being increased by a deep breath and
Tenderness is often observed, and sometimes hyperæsthesia of
Dyspnœa is an early and prominent symptom, as evidence
sensations of the patient: the rapidity of the breathing, which,
is abrupt and shallow; by the working of the nostrils; and dif
speech. The pulse-respiration ratio is greatly disturbed, the
tions ranging from 30 to 60, or occasionally even reaching 80
sionally orthopnœa exists. Cough also commences very soon.
not come on in violent paroxysms, but is short and hacki
spasmodic and difficult to repress, especially when the patient
to breathe deeply or to sit up, while the act causes much
Expectoration speedily ensues, the sputa presenting peculiar c
They are scarcely at all frothy, but exceeding viscid and adh
that they are discharged only with much difficulty, have to
from the mouth, and often do not fall out when the vessel which

e pigment; abundant granules and oil-globules; free nuclei; mally pus-cells. Chemical examination yields mucin; albun a little sugar; salts, especially chlorides; and, it is said, ly a special acid. The expired air may be cool, and is deficient anhydride.

ing the ordinary local symptoms of acute pneumonia, it must n mind that very considerable deviations may be noticed, due ent being very young or old, or feeble; to the portion and ng-tissue affected; the type and course of the pneumonia; isease being secondary. It is impossible to point out here the ns met with, but it may be mentioned that pain and other are sometimes very slight or absent—*latent pneumonia;* and uta may be absent or merely bronchitic; or in low cases t the appearance of a dark, offensive, thin fluid, resembling r prune-juice. Occasionally they are tinged with bile.

These may be summed up in general terms as high pyrexia, depression and prostration.

soon becomes exceedingly hot and dry, having a burning, Sometimes perspiration takes place, but there is no relief. rature rises with great rapidity to 102°, 103°, 105°, or even he maximum is generally reached on the second or third e temperature may continue to ascend until near the termie case. It has been known to rise to 107° in cases which ered, and in fatal cases has attained 109·4°. In a large instances the temperature does not go beyond 103° or 104°. ariations are usually as follows. The temperature is lowest orning, and begins to rise in the forenoon or soon after, s maximum early in the evening. It then falls, but in some ht rise is again observed at midnight, after which a gradual lace. The remission ranges from $\frac{3}{8}$° to 2·5°, but is seldom 1·8°. Usually it ceases altogether a day or two before the rare instances, when pneumonia is associated with interer, the temperature becomes quite normal in the mornings—*pneumonia.* An extension of inflammation or a relapse will quently becomes weak, small, and yielding, sometimes intermittent or irregular. The sphygmograph affords useful indications as to its characters.

A prominent symptom in most instances is the great and evident prostration and feebleness of the patient. The position assumed is generally on the back with the head rather high, and it is often only with difficulty that the patient can be made to sit up.

The digestive organs present to a marked degree the ordinary symptoms associated with pyrexia. The tongue tends to be dry, and the lips to crack. As occasional and usually unfavourable symptoms there may be dysphagia; severe vomiting; jaundice with enlarged liver; or diarrhœa. The ordinary cerebral symptoms are headache, sleeplessness, and restlessness, often with slight nocturnal delirium. The urine, in addition to being highly febrile, frequently contains a little albumen, and chlorides are very deficient or entirely absent.

In some cases the symptoms assume an adynamic character, indicated by a dry brown tongue, with sordes; and low nervous phenomena, such as delirium, stupor, coma, convulsions, twitchings and tremors, and affections of the senses—*typhoid pneumonia.* This is especially apt to occur if the patient is old, very weak, or intemperate; if the disease is secondary to certain acute and chronic diseases, or attended with high pyrexia; or if it goes on to suppuration or gangrene, which causes extreme prostration. In drunkards the symptoms at first often resemble those of delirium tremens, followed by collapse. Occasionally they simulate those of mania or cerebral inflammation. The formation of pus is usually attended with severe rigors and increase of pyrexia. If it collects in an abscess, it may be suddenly discharged along with fragments of lung-tissue.

Sometimes distinct signs of cyanosis set in, with distension of the right side of the heart and venous system, and formation of coagula in the pulmonary vessels.

PHYSICAL SIGNS.—I. *Stokes's stage.* At this time the only sign is a harshness and roughness of the breath-sounds, these being usually exaggerated. I have had several opportunities of verifying that this stage is a reality.

II. *Engorgement-stage.* 1. Respiratory movements are deficient, partly on account of pain. 2. Vocal fremitus is often increased. 3. Percussion-sound is usually not much altered, but may be abnormally clear, or slightly deficient in resonance. 4. Respiratory-sounds are harsh and weak, or occasionally somewhat bronchial. 5. The principal physical sign is the *true crepitant rhonchus,* which is heard over the affected portion of lung.

III. *Red hepatization-stage.* 1. There may be slight enlargement of the side. 2. Movements are greatly impaired, especially expansion. 3. Vocal fremitus is in excess. 4. Percussion as a rule reveals dulness with increased resistance; sometimes the percussion-note is rather hollow, and of tubular or even amphoric quality. In basic pneumonia a tubular or tympanitic note can sometimes be elicited over the front of the upper part of the chest. 5. The respiratory sounds afford one of the most important signs. Frequently they are typically tubular, dry, high-pitched, whiffing or metallic; sometimes merely blowing or bronchial. 6. Crepitant rhonchus is often heard at the confines of the nging of metallic character. The other abnormal signs appear, sometimes with great rapidity, in other cases only gradually; sometimes they remain. The dulness may sub- ches. Occasionally slight retraction of the chest follows an neumonia.

is just described are commonly observed at one or both bases. may be met with, due to the consolidation becoming extreme, eing completely blocked up; to the inflamed part lying deep ; or to other unusual conditions. Diffuse suppuration gives ndant, liquid, bubbling râles. An abscess or gangrene is the signs of a cavity. The signs of bronchitis and pleurisy resent. In the unaffected parts respiration is exaggerated.

TIONS AND DURATION.—1. In the majority of cases pneu- s in complete recovery by resolution. Usually a marked place, the temperature falling rapidly to or even below the ile the pulse and respirations also diminish in frequency, and mptoms speedily abate, convalescence being soon established. ns usually from the third to the eleventh day, being most out the end of the first week, but not necessarily on odd ne suppose. The crisis is attended with profuse perspiration; t discharge of urine, which deposits lithates, oxalates, and , or sometimes contains blood; or occasionally with diarrhœa, d other hæmorrhages, or the development of a skin eruption. followed by considerable and even fatal collapse. In some rescence takes place by lysis, convalescence being protracted. ery may ensue even after gangrene or abscess. A relapse happens. 2. Death may occur either from asphyxia; or more from collapse and exhaustion. This may take place even risis. 3. Now and then transition into chronic pneumonia , the exudation remaining unabsorbed, and the symptoms with irregular fever and loss of flesh. Ultimately a form of sometimes set up adhesions of the pleura or pericardium; the disease being secondary; both lungs being involved, or the whole of one, or its central or upper part; the sputa being very abundant and watery, or like prune-juice, or absent with signs of accumulation in the lungs; the termination in diffuse suppuration, abscess, or gangrene; the development of typhoid and low nervous symptoms, or those indicating marked collapse; signs of apnœa; the existence of serious complications, such as gastro-enteric catarrh or pericarditis; a low epidemic type.

TREATMENT.—Of course it is highly important in treating pneumonia to observe all the precautions demanded in the management of lung diseases in general, but the sick-room must be well-ventilated. Three main plans of treatment have been adopted in the management of this disease, viz., 1. *Expectant.* 2. *Antiphlogistic.* 3. *Stimulant.* However, no uniform method ought to be followed, but it is essential that each case should be carefully considered in all its details, and the treatment modified accordingly.

1. The *expectant* plan, in which the patient is merely protected against injurious influences, and properly fed, while symptoms are relieved, the cure of the disease being left to nature, is one which unquestionably may be carried out with advantage in many instances; but to apply it to all cases indiscriminately is most injudicious.

2. In the *antiphlogistic* treatment, the chief remedies employed are venesection or local removal of blood; tartar emetic; calomel and opium; digitalis, aconite, or veratria. It has been satisfactorily proved that venesection is rarely required, cases in which it might be indicated doing just as well without it, and in a great many instances it would be most injurious. It may relieve dyspnœa and diminish fever, but only temporarily. Moderate bleeding is occasionally requisite, in order to avert death from apnœa. Local bleeding cannot subdue the inflammation, but it is useful sometimes in mitigating symptoms. Tartar emetic is decidedly a serviceable drug when the patient is strong and plethoric. It should not be given in large doses; from gr. $\frac{1}{4}$ to $\frac{3}{4}$ every four hours being quite sufficient for an adult, and it may be combined with compound tincture of camphor and hydrocyanic acid. Of the use in this disease of the other drugs mentioned I have no experience.

3. Many practitioners have recourse to the *stimulant* treatment, giving large quantities of alcohol, in the form of wine or brandy, with ammonia, chloric ether, camphor, and similar remedies. The routine employment of these remedies, however, is to be equally deprecated with those of the opposite class, for they are often unnecessary and may do more harm than good. In many instances they are most valuable, the quantity to be given depending upon the nature of the case, and their usefulness or the reverse being judged of by the effects produced. It is a good rule if in doubt to try them carefully. The main indications for stimulants are delirium, if not associated with vascular excitement; a very rapid, weak, or dicrotic pulse; any signs of adynamia or collapse, with low nervous symptoms; the patient being old or feeble; and the inflammation being secondary. In all low forms of the disease the only chance of recovery lies in free stimulation, a pint or more of brandy being often required in the twenty-four hours, and if necessary there

be no hesitation about giving this quantity. At the same time of carbonate of ammonia with decoction of bark, spirits of n, ether, camphor, musk, and such remedies must be adminis- some cases quinine with iron is useful, and in very adynamic oil of turpentine has been recommended, which may be by enema. In most instances it is advisable to give a little ndy after the crisis, as there is often much exhaustion at this

n to diet is of considerable moment. In all cases a good beef tea and milk should be administered at regular intervals. nt support is often needed. Cooling drinks are useful, or drink may be freely allowed.

eatment. The application of cold to the chest has been either by means of wet compresses frequently changed, or ered with muslin. Great caution must be exercised in their t. Hot fomentations or poultices, either alone or with turpentine fomentations; or sinapisms are useful for the 1. Blisters are only needed in the advanced stages as a rule, n then if absorption is going on satisfactorily.

are frequently required to relieve pain, procure sleep, and tressing cough. They must be given with due caution. c injection of morphia is often most valuable. Hydrate of useful substitute in many cases, as well as other sedatives cs. If there is high pyrexia full doses of quinine may be might be requisite to have recourse to baths. Should ex- be very difficult, on account of excessive viscidity of the es are recommended. Chloride of ammonium with squill on of senega are useful in such cases, especially during the

re is necessary during convalescence, and the patient should ler observation until thoroughly convalescent. Tonics are at this time, with good diet, and cod-liver oil in some cases.

ATARRHAL PNEUMONIA. DISSEMINATED OR LOBULAR PNEUMONIA. BRONCHO-PNEUMONIA.

Y.—This variety of lung-inflammation may assume an acute orm, and in the great majority of cases it arises in the course s, being either the result of direct extension of inflammation inute bronchi to the air-vesicles; or more commonly being llapsed lobules. Acute catarrhal pneumonia is by far most nong children, being particularly observed in connection g-cough, measles, diphtheria, and influenza, but it may arise tly of these affections. It is predisposed to by debility; of impure air; and a long-continued recumbent posture. son to believe that the pneumonia occurring in the aged and in those dying from acute or chronic diseases, is not un- f this nature. As a more or less chronic affection, resulting d extension of bronchial catarrh into the alveoli, catarrhal is now looked upon by many pathologists as originating a

large proportion of cases of phthisis. It may be produced in conn
with dilated bronchi.

PATHOLOGY AND ANATOMICAL CHARACTERS.—There is no
ous exudation, such as is characteristic of croupous pneumoni
merely a proliferation of the cells lining the alveoli, which beco
abundant as to fill and distend the latter. In favourable cases t
undergo liquefaction, and are absorbed or discharged. Son
abscesses are formed; or cheesy degeneration ensues, ultimately
to destruction of the lung-tissue or tuberculosis. Chronic int
pneumonia may be set up. When following collapse, the mor
pearances are usually confined to isolated lobules, but by their
cence large tracts of lung-tissue may be involved, especially at t
and along the posterior borders. Generally they are mingled wi
of bronchitis; congestion with œdema; or merely collapsed
The inflamed lobules are disseminated irregularly through bot
being most abundant towards the bases, along the lower free bor
at the surface. They vary in size considerably, and when su
have a pyramidal or wedge-like form, with the base outwards, p
somewhat beyond the surface. They feel like firm solid knots
in reality friable, breaking down readily under pressure. A
presents a more or less greyish-yellow colour, gradually fading
rounding congestion, with generally a granular aspect. A
opaque, non-frothy fluid can be scraped or pressed from the
containing abundant cells, many of which resemble under the mi
pus and mucus corpuscles. Within the lobules there are oft
dilated bronchi, containing a purulent fluid. The affected p
instantly in water. The appearances just described are those
when the inflammatory process is well-established, but gradu
tions are observed from merely collapsed lobules.

When the inflammation is independent of collapse, very n
small, ill-defined, whitish-yellow spots are seen scattered thro
gested and œdematous lung-tissue, only slightly granular, and
an opaque milky fluid on pressure. In some parts little cavit
containing a pus-like matter, but many are of opinion that
gravitated into the minute bronchi or air-vesicles, or has been
during inspiration.

SYMPTOMS.—Usually occurring in the course of other co
especially bronchitis, the symptoms of acute catarrhal pneum
set in very speedily, as in measles, or gradually, as in hoopi
but they are generally modifications of those previously existin
rarely is the onset indicated by any rigors or other marked pre
symptoms, such as are observed in ordinary pneumonia. Py
most important sign, the temperature rising often to 103°, 104°,
the remissions, however, are considerable, and irregular as to ti
renewed exacerbations are liable to occur after the temperatu
come normal. The skin often perspires freely, and is not pung
feel. The pulse increases in frequency, but soon tends to beco
and irregular. The chest-symptoms when the complaint follow
tis are increased dyspnœa, the respirations being exceedingly
a change in the characters of the cough, which often becomes sh
hacking, and painful, the child endeavouring to repress it, an

ing an expression of pain, or crying; and diminished expectoration, the sputa being scarcely ever "rusty." Physical signs are exceedingly uncertain and ill-defined. In the parts corresponding to the consolidated portions there may be increased vocal fremitus; dulness; bronchial breathing; small, scattered, sometimes ringing râles; and bronchophony.

The course of the disease may be exceedingly acute and rapid; or subacute. In the former class of cases there is generally great restlessness and anxiety; or the patient may soon fall into a stupid and apathetic state. Signs of cyanosis are common. Loss of strength and emaciation are prominent characters, the latter being especially marked in the less rapid cases. The subsidence of the disease in cases of recovery is usually very gradual and protracted, there being no crisis, but an irregular defervescence by lysis. As already mentioned, catarrhal pneumonia may lead to permanent lung mischief.

TREATMENT.—All lowering measures are decidedly injurious. Ipecacuanha wine is useful, with salines; or ammonia and senega, if there is much debility. Abundant nourishment is required, with alcoholic stimulants in many cases. Emetics are sometimes serviceable to aid in unloading the lungs. The continued application of cold compresses to the chest has been strongly recommended. Sinapisms are often necessary. Great care is required during convalescence, and tonics, cod-liver oil, good diet, with wine, are indicated.

III. CHRONIC OR INTERSTITIAL PNEUMONIA. CIRRHOSIS OF LUNG. FIBROID PHTHISIS. FIBROID DEGENERATION. INDURATION WITH DILATED BRONCHI.

ETIOLOGY AND PATHOLOGY.—The forms of pneumonia already described may become more or less chronic, but the condition now under consideration is one in which the lung becomes greatly contracted and indurated, pigmented, the air vesicles being obliterated, and the bronchial tubes usually dilated. These changes are generally considered as partly due to proliferation of the interlobular and subpleural connective tissue; and partly to the formation of a nuclear growth, which develops into extensive tracts of fibroid tissue; but some regard them as the result of a chronic inflammatory process; or of a fibroid change affecting the walls of the alveoli themselves. There can be no doubt but that in the great majority of cases this disease is secondary to some previous pulmonary affection, being the consequence of long-continued irritation. The conditions of which it may thus be a sequel are:—
1. Acute croupous pneumonia very rarely. 2. Catarrhal pneumonia frequently. 3. Dilatation of the bronchi, though Dr. Wilson Fox thinks that the fibroid change is then preceded by catarrhal pneumonia. 4. Collapse or compression of the lung. 5. Pleurisy, but it is doubtful whether the change can then extend to any depth, unless pneumonia precedes it. 6. Bronchial irritation from inhalation of mineral and other particles, such as steel, coal or stone-dust, cotton. 7. Various deposits, such as tubercle or cancer; phthisical cavities; pulmonary hæmorrhage or abscess; or injury. In these conditions the morbid process is localised, and may really be a method of cure.

Some pathologists, however, consider that interstitial pneumonia is in some instances essentially *primary*, being, as some think, the result of a chronic inflammatory process in the interstitial tissues resembling that which takes place in cirrhosis of the liver; or, as others believe, a direct, idiopathic, fibroid change, degeneration, or substitution in the walls of the alveoli, not associated with inflammation, which process tends to spread through the lung. No cases bearing out this view have ever come under my notice.

It is necessary to allude to the relation of dilated bronchi to chronic pneumonia. Doubtless in many cases this dilatation is secondary to the induration; but there is every reason to believe that the former is sometimes the original morbid condition, and gives rise to the fibroid change.

ANATOMICAL CHARACTERS.—In the early stage of chronic pneumonia, the tissue is congested, but it afterwards becomes paler, and may exhibit extensive tracts of a homogeneous-looking nucleated substance. When the process is advanced, the appearances are very characteristic. The lung is contracted and shrunken; its tissue is hard and dense, cannot be torn, and creaks on being cut. A section is smooth and dry, pigmented, often presenting a marbled grey aspect, while fibrous bands or masses may be seen traversing the section, some of the former being probably obliterated and thickened bronchi or blood-vessels. The vesicular tissue is destroyed, but many of the bronchi are usually dilated. The fibrous growths may ultimately become caseous.

The extent of lung involved varies considerably. The change may be limited at first to the bronchi and the tissue immediately around; or it may only be visible around deposits or cavities. A peculiar feature of this disease is, that it is usually limited to one lung, which it may affect throughout, or be confined to its base, apex, or middle part.

The pleura is usually thickened, sometimes extremely so, and adherent. Emphysema is common in unaffected parts of the lungs, and other morbid conditions are frequently seen with which the chronic pneumonia is associated as a sequel.

SYMPTOMS.—Interstitial pneumonia runs a very chronic course, and its symptoms at first are not definite, but when it is fully established it may present well-marked clinical characters. The local symptoms are dragging pains about the sides; shortness of breath; and cough, which is often irritable, difficult, and ineffectual; or comes on in fits, attended with the expectoration characteristic of dilated bronchi. The complaint is often attended with general symptoms, viz., very gradual loss of flesh and strength; anæmia; sometimes night-sweats; but pyrexia is absent as a rule, or it is but slight. After a time signs of obstructed circulation may set in.

PHYSICAL SIGNS.—These indicate dense consolidation and contraction of lung; often with cavities due to enlarged bronchi. 1. The whole side is retracted, often extremely. 2. Movement is deficient or absent. 3. Vocal fremitus may be increased or diminished. 4. Percussion gives a hard, wooden, high-pitched sound, with marked resistance. Occasionally the sound is tubular in some parts. 5. Respiration sounds differ in different parts, being weak or absent, bronchial, tubular, or cavernous. After a cough they are often heard where previously absent. 6. Various râles may be heard in the dilated bronchi. 7. Vocal resonance is variable, being deficient, bronchophonic, or pectoriloquous sometimes. 8. The heart is often displaced towards the affected side; the opposite lung encroaches in this direction; and the liver is drawn up.

TREATMENT.—The management of this disease is really that of a certain form of phthisis. Nourishing diet is necessary, with tonics, iron, and cod-liver oil. Counter-irritation is often useful, especially by means of tincture of iodine. Iodide of potassium has been recommended internally for the purpose of promoting absorption, but it is of very questionable value. Cough must be alleviated, and expectoration improved by the usual remedies. The patient must be warned against unnecessary exertion if the disease is extensive, as this is sure to bring on shortness of breath.

CHAPTER X.

GANGRENE OF THE LUNG.

ETIOLOGY.—The conditions under which gangrene of the pulmonary tissue may arise are the following:—1. As the result of local disease, viz., acute or chronic pneumonia, phthisis, cancer, hydatids, bronchial dilatation. 2. From an embolus obstructing one or more of the nutrient vessels. 3. In connection with blood-poisoning, as after low fevers, pyæmia or septicæmia, glanders, or poisoning by venomous animals. 4. In extreme exhaustion from want of food and bad hygienic conditions, or from disease. 5. In certain nervous diseases, pulmonary gangrene being observed occasionally in cases of chronic dementia, chronic softening of the brain, alcoholism, and epilepsy.

ANATOMICAL CHARACTERS.—The gangrene is either *circumscribed* or *diffuse*. The circumscribed variety is that usually seen, but it may become diffuse. In the former the part involved is distinctly defined, but its extent varies much. The usual size is from that of a hazel-nut to a walnut, but a considerable portion of a lobe may become gangrenous. The lower lobes and the superficial parts of the lungs are most liable to be affected. The gangrenous portion soon becomes moist, softened, pulpy, bluish-green, and extremely fœtid; or it may have a greenish-black core, with broken-down lung-tissue around, a stinking, irritating liquid escaping on pressure. The materials may be discharged through a bronchus, leaving a ragged sloughy cavity, often with inflamed tissue around. Vessels frequently traverse this space, but as coagula have formed in them hæmorrhage does not take place as a rule. Rarely an opening may be formed into the pleural cavity, or even into the subcutaneous cellular tissue, in consequence of adhesions between the two surfaces of this membrane. Subsequently in very exceptional cases a fibrous capsule may be developed, the sphacelated portion is expelled, and a cavity secreting healthy pus remains, which ultimately may close up and cicatrize.

The diffuse form does not present any line of demarcation, but runs into or is mixed up with congested, inflamed, or œdematous lung tissue. A whole lobe or the greater part of a lung may be implicated, being softened sometimes to pulpiness, greenish or brownish-black or black, more or less saturated with a dirty greyish-black liquid, and, in short, in the condition of a moist, stinking, putrid slough.

SYMPTOMS.—The only two symptoms which are characteristic of gangrene of the lung are extremely fœtid breath; and the expectoration of gangrenous matters with fragments of lung-tissue. The former may precede the latter sympton for some days, and it is sometimes only observed at intervals. It must be remembered, however, that the breath may be very foul in some cases of chronic bronchitis. The sputa subsequently become foul, frothy, partly liquid, partly muco-purulent, often dirty, brownish or blackish, containing gangrenous particles and occasionally fat crystals, while elastic fibres may be detected in some cases. More or less blood is often present, and death may result from hæmorrhage. On standing the sputa separate into layers, and a thick sediment falls. The general symptoms in most cases are those of extreme depression, adynamia, and collapse, with low nervous phenomena, ending in speedy death. If the gangrenous materials are swallowed, severe diarrhœa with tympanitis is liable to set in. Emboli may be carried from the lung and originate septicæmic abscesses elsewhere. Occasionally death takes place by a slow process of hectic; or very rarely recovery may ensue.

PHYSICAL SIGNS.—At first these are merely indistinct breathing, with moist râles; followed, if the gangrene is circumscribed, by more or less marked signs of a cavity containing thin fluid. Extensive bronchitis or pleurisy is often set up.

PROGNOSIS is necessarily exceedingly grave.

TREATMENT.—The measures to be adopted are to administer abundant nourishment and large quantities of alcoholic stimulants, with ammonia and bark, ether, camphor, mineral acids, or quinine; to use frequent inhalations of creosote, carbolic acid, tar-vapour, or turpentine; to encourage expectoration in every way; and to let the patient gargle freely with some antiseptic, especially Condy's fluid, and drink a solution of chlorate of potash or yeast. Various antiseptics have been recommended internally, such as carbolic acid or sulphocarbolates, sulphites, and hypochlorites. Should the disease become chronic, as well as during convalescence, tonics are needed, with cod-liver oil, change of air, nutritious diet, and other measures for improving the general health.

CHAPTER XI.

EMPHYSEMA OF THE LUNGS.

Two primary forms of this affection are met with, named respectively VESICULAR and INTERLOBULAR. *Vesicular emphysema* is characterised by enlargement of the air-vesicles, either from excessive distension,

n of their septa, or from both causes combined. *Interlobular*
signifies the presence of air in the subpleural and interlobular
sue, usually the result of rupture of vesicles.

I. VESICULAR EMPHYSEMA.

Y AND PATHOLOGY.—Within the definition of this morbid
s above given, cases are comprised which differ considerably
linical aspects and importance. They may, however, be
four groups, though these are frequently more or less con-
:—1. Acute emphysema, either general or local. 2. Chronic
ous, or "large-lunged." 3. Chronic limited. 4. Atrophous,
unged." It will be convenient to consider first their etiology
, and then to indicate whatever specially applies to each
orm.

e, direct, or determining causes.—1. *Inspiratory theory.* Ac-
this view, emphysema is the result of excessive or long con-
ension of the air-vesicles during inspiration. Thus it is sup-
general emphysema may arise as a consequence of diminished
force, such as that which accompanies the loss of elasticity in
nd chest-walls in old age, the inspiratory force remaining
. Hence the lungs are kept constantly distended, and they
pt to become so if inspiration is performed vigorously. Again,
ons of the lungs are from any cause, such as pleuritic adhe-
pse, or consolidation, rendered partially or entirely incapable
n, should the chest still enlarge to the usual extent during
the air which ought to enter these unused portions passes
parts and stretches their vesicles unduly. This is named
nphysema. Dr. C. J. B. Williams believes that in this way
a is originated in bronchitis, the secretions or thickened mucous
obstructing some of the bronchi, and preventing the air from
ne corresponding vesicles, while those which are adjacent,
tubes are free, receive an excessive amount of air. On the
l, Laennec's view was that the vesicles terminating the ob-
ronchi become themselves dilated, in consequence of air
uring inspiration, which cannot be forced out during expira-
e the emphysema was termed *substantive.* It has been argued
s theory that expiration is a more powerful act than inspira-
hich it is replied that a forced expiratory effort has very little
n emptying the air-vesicles, especially if the smaller tubes are

ratory theory. Sir William Jenner strongly advocates the
t emphysema is commonly the result of violent expiratory
n partial closure of the glottis, such as are carried on during
lifting heavy weights, playing wind instruments, and other
There are certain parts of the lungs which are much less sup-
d compressed by the chest-walls and surrounding structures
s, and hence they yield under the above circumstances and
istended. This is especially true with regard to the apices,
r margins, and the edges of the bases, especially the left. The
o the development of emphysema in this way is greater in pro-

portion to the extent to which the lung is inflated; to the obstruction to the escape of air; to the force which is exercised in its attempted expulsion; and to the want of compression and support of the lung-tissue.

Niemeyer does not seem to lay much stress on the want of support in leading to emphysema from forcible expiration, but rather on the direction of the force. He says, " In all these acts (*i.e.*, coughing, straining, &c.) contraction of the chest is effected by vigorous upheaval of the diaphragm. The result is the expulsion of a strong current of air from the lower bronchi, the direction of which is obliquely upward, and, if the air be prevented from escaping through the larynx, a portion of it, in a compressed state, must be driven into the upper bronchi, whose direction is obliquely downward. By the centrifugal pressure exerted, by the air thus compressed, upon the vesicles of the upper lobes of the lung, and upon the adjacent thoracic wall, the latter become distended as far as it is possible for them to yield."

3. Some pathologists are of opinion that emphysema is due to primary nutritive derangement of the walls of the air vesicles. Villemin describes a " hypertrophy of the elements of the vesicular membrane, causing an extension of this, and an increase in the capacity of the vesicles." As a secondary result of emphysema, nutritive changes in the walls of the vesicles are constantly seen; and should these be impaired in their resisting power, they are far more liable to become distended by any force acting upon their interior. Hence in old persons one attack of winter-cough will often set up a considerable amount of emphysema, and when chronic bronchitis or congestion has existed for a length of time, the resulting alterations in structure render the vesicles much more capable of distension. Atrophous emphysema is the consequence of primary degeneration, the partitions wasting and disappearing, several vesicles being thus thrown into one; but in other forms of the complaint degenerative changes must probably be rather looked upon as predisposing or " permanence-securing " causes of emphysema, as Sir W. Jenner terms them, than as actual determining causes. What these morbid changes are will be considered under the anatomical characters.

4. Another theory, that of Freund, is that in some cases there is a primary chronic enlargement of the chest, in consequence of hypertrophy and rigidity of the cartilages, and that the lungs become distended and emphysematous in order to fill up the increased space. This must be a very exceptional cause.

No exclusive theory as to the mode of production of emphysema can apply to all cases; and in many doubtless more than one of the causes mentioned has been at work.

Exciting causes. 1. Emphysema is liable to arise in the course of many pulmonary affections, viz., bronchitis, especially chronic dry catarrh; consolidation or destruction of portions of the lung from any cause; collapse; extensive pleuritic adhesions or effusion. 2. Hooping cough is a common cause in children. 3. Croup and other affections obstructing the main windpipe and exciting much cough at the same time, are often followed by emphysema. 4. Cardiac diseases which lead to permanent congestion of the pulmonary capillaries mate-

in its production, by inducing degenerative changes in the
the vesicles. 5. Emphysema may be directly brought on by
ind instruments, excessive effort, lifting heavy weights, strain-
ol, climbing hills, and other forms of exertion.

vsing causes. Hereditary influence has been supposed to pre-
emphysema, especially in those cases in which it comes on
rly life, but this is by no means certain. The complaint is
st common among persons advanced in years. Children,
ften suffer, in consequence of their liability to pulmonary
nd the weakness of their chest-walls. Gouty and fat subjects
be predisposed.

sation of the several forms of emphysema demands brief con-
What is termed *acute general emphysema*, which is common
bronchitis, is due to a want of power in expelling the air, in
e of obstruction, which therefore accumulates in the small
d inflates the lungs. Many object to this condition being
ysema, and they name it *insufflation* or *inspiratory expansion*,
re is no actual disease, but merely an inflation of the lungs,
subside if the obstruction is speedily removed, but if not per-
physema is established.

n difficulty lies in determining the mode of production of
ertrophous emphysema following chronic catarrh. It is re-
many as being inspiratory in its origin, but Sir W. Jenner
to be the result of forcible expiration, and explains its
ribution by the fact that as the lungs and chest enlarge, the
ition of the former to the ribs and intercostal spaces becomes
hanged, so that successive portions of the lung are brought
ondence with the spaces, and these being less supported
rts opposite the ribs, they are unduly distended during
thus ultimately the lungs become more or less emphysematous
though the condition is at the same time most marked at
nd margins, which are least supported.

emphysema, whether acute or chronic, is probably as a rule
luring expiration. In some instances it is inspiratory, being
antive or vicarious.

atrophous emphysema is merely due to wasting of the septa,
me obliterated so that the vesicles coalesce to a variable
short it is an atrophy of the lung-tissue, usually observed in
g with other atrophic and degenerative changes.

AL CHARACTERS.—In acute general emphysema the lungs
d throughout, and do not collapse or may even bulge out
est is opened. The degree of expansion varies much. The
r pale, the capillaries being stretched and their network
The bronchi will be found to be more or less obstructed.

ypertrophous emphysema is also attended with enlargement
and on opening the thorax they are seen to extend beyond
ry limits, often covering the pericardium completely, and
rotrude or collapse only very imperfectly, this necessarily
pon the extent of the disease. Though the morbid condition
less general, the apices, anterior borders, and other parts
s which are least supported present the most marked

evidences of it, as well as the surface usually. The emphysematous portions have a peculiar soft feel, compared to that of a "cushion of down," and retain the impression of the finger, elasticity being impaired. The so-called crepitant sensation of healthy lung is deficient or absent, and on cutting a dull creaking sound is often heard. The tissue is pale, bloodless, and dry, but presents irregular spots of black pigment derived from altered blood in obliterated capillaries. The vesicles are seen to be enlarged more or less, varying usually from a hemp-seed to a pea in size, but often many of them are thrown into one, giving rise to irregular spaces of considerable size, traversed by slender bands, the septa being visible as slight ridges or having disappeared entirely. Contiguous lobules may freely communicate, and ultimately nothing be left but a coarse network. These appearances are best observed after inflating the lung, drying it, and then making a section.

The nature of the changes in the alveolar walls has been much discussed, but there is no reason whatever to suppose that these should be identical in all cases. The violence of the pressure may rupture the septa and walls directly, but usually their destruction is gradual. They become stretched and atrophied; present perforations varying in size and number; and ultimately only traces of them are seen, or they may disappear altogether. The structural alterations which have been described are the formation of an imperfect fibrous tissue, inducing toughness and thickening, as the result of long-continued congestion (Jenner); or fatty degeneration (Rainey). Dr. Waters of Liverpool considers that this is a primary mal-nutrition of the pulmonary tissue, leading to its degeneration, but the exact nature of this he has been unable to ascertain. The elastic and other elementary tissues disappear. The capillaries in the affected part become stretched, narrowed, obliterated, or some of them even rupture. Ultimately they are absorbed, and only pigment, the remains of the blood-colouring matter, is left behind.

In the localized variety of emphysema, the appearances are confined to certain parts, especially the apices and anterior and lower edges, being similar to those described as characteristic of the more extensive form.

In true atrophous emphysema the lungs are diminished in size; shrink into a very small bulk when the chest is opened; and are very light. The divisions between the lobes are unusually vertical. The pulmonary tissue is pale but much pigmented, dry, and deficient in elasticity. The vesicles are enlarged, owing to atrophy of the septa.

Other morbid conditions are often seen in emphysematous lungs, such as bronchitis, collapse in some parts, or, not uncommonly, dilated bronchi. Pleuritic adhesions generally exist. When the emphysema is extensive, the contiguous structures are displaced, and after a time all the organs of the body become the seat of congestion and the resulting changes. Different statements have been made as to the position of the heart. My own observation would lead me to agree with those who describe it as lying with the right border horizontally on the diaphragm, and the apex too much down and to the left. Its right cavities become dilated and hypertrophied in course of time.

SYMPTOMS.—It is only chronic hypertrophous emphysema which leads to any prominent symptoms, and these are chiefly indirect. This con-

tarrh of other morbid conditions; and fits of spasmodic
cute attacks of bronchitis are very liable to occur.
, variable in degree, is the main symptom directly due to the
. At first there is merely "shortness of breath" on exer-
ally on going up a hill or after a full meal, but ultimately
xpiratory dyspnœa is experienced, though not accompanied
distress ordinarily, but rather with a sense of discomfort and
It is often relieved by pressing the sides, or lying on the
After a meal it becomes worse, especially should the patient
from dyspepsia, and it is necessarily much aggravated if bron-
hma should set in. The causes of the dyspnœa are the great
with the respiratory movements, owing to the depressed
diaphragm and the rigid state of the chest-walls; the diffi-
elling the residual air, and small amount of pure air inhaled;
tual loss of surface fit for aërating the blood. Cough is
esent, but is chiefly the result of bronchial catarrh, when it
with expectoration; otherwise it is dry. There is no pain in
pendent directly upon emphysema.
r symptoms observed in connection with emphysema are
hose due to interference with the circulation will be more
described when considering heart diseases. As the result
ased respiratory efforts the respiratory muscles hypertrophy;
eck often looks large. The fat is absorbed, giving rise to
with strongly-marked features. The symptoms due to imper-
ëration are similar to those already described, only more
oduced, and there is general apathy and languor, with a
elaxed state of the muscles from this cause.

SIGNS.—These will necessarily differ much according to
and variety of the emphysema, and the morbid conditions
t is associated. 1. *Shape and size of the chest.* In general
us emphysema the chest is more or less enlarged, either
or only in its upper or lower part. It may assume a per-
piratory form, or even go beyond this, becoming "barrel-
l almost circular. There is often a rounding of the chest in

amount of resonance with fall in pitch, the sound approaching
panitic character, but being usually more or less muffled. If t
sion of the lungs is extreme, there is deficient resonance w
resistance. 4. *Respiratory sounds.* The important change is
prolongation of the expiratory sound, but this is not obser
atrophous variety. In pure emphysema the sounds are we
harsh quality. The extent over which they are heard is
5. A crepitant rhonchus, already alluded to, is said to be
heard. Râles due to bronchial catarrh are often present.
fremitus and resonance are quite unreliable. As a rule th
ficient. They may be observed over a larger area than usual.
are signs of displacement of organs, especially of the heart.
impulse is common. 8. The visible veins often afford signs
tion to the circulation, but not in the atrophous form.

PROGNOSIS.—Emphysema is serious in proportion to its
lays the foundation for a very miserable existence in many
creases the tendency to bronchial catarrh; and adds gre
danger from an acute attack of bronchitis. Once it is
established it cannot be cured.

TREATMENT.—This part of the subject may be very brie
up, not because it is unimportant, but because the principle
it must be conducted need only be mentioned here, the me
rying these out being described in other parts of this work.
precaution must be taken against the occurrence of bronc
not only on account of its danger, but because each attac
increase the emphysema. Other known causes of emphyse
avoided. 2. It is very important to look to the state of the
canal, as a deranged condition of its functions frequently c
increases the discomfort attending emphysema. 3. The
associated with the emphysema must be attended to as they
cially asthma; cardiac diseases; congestion and its result
dropsy; and the complications which occur in its course,
bronchitis. Narcotics must be used with particular cautio
often requisite to improve the general health and the cond
blood by the aid of tonics, iron, and cod-liver oil; or to
constitutional diathesis, especially gout. 5. Whether th
curative remedy for emphysema is very questionable. D
changes may be checked by proper dieting. Strychnine,
breathing compressed air, and other remedies have been st
duce some improvement.

A change of climate is often exceedingly beneficial in
Usually a mild climate not too dry suits best; but it is
matter of personal experience as to which is most suitable.
recommended to spend the summer in pine-wood regions,
is a heavy fall of dew.

II. INTERLOBULAR OR INTERSTITIAL EMPHYSEM

ETIOLOGY.—This is a very rare condition, resulting
rupture of the air-vesicles, as a consequence of excessive pr
their interior during forcible expiration, the glottis being

much contracted. Thus it may be induced by violent cough, hing, or straining during defæcation or parturition. It is said to be ncommon in croup; and to happen sometimes as the result of sive collapse. Gangrene of the lung or post-mortem decompo- may lead to the presence of air in the interlobular tissue.

TOMICAL CHARACTERS.—Accumulations of air are seen under the , varying in size but generally small, and they may form a border ute vesicles around the lobules. The air can by pressure be dis- along the course of the boundaries of the alveoli. Superficial ons occasionally give way, opening into the pleura and giving pneumothorax; or into the posterior mediastinum, leading to subcutaneous emphysema.

TOMS.—The only symptom which might lead to the suspicion orbid state, is the occurrence of severe dyspnœa following one uses. It is said that a faint *friction-sound* is sometimes heard. neumothorax or general subcutaneous emphysema be produced, ld be indicated by the usual signs.

MENT.—This consists in taking every precaution to prevent hief from extending; and attending to its consequences.

CHAPTER XII.

ASTHMA.

of this term is ambiguous, but it may be employed to in- cases characterised by the occurrence of severe paroxysmal f dyspnœa. Four chief forms may be mentioned, viz.:—1. *l.* 2. *Bronchial*, either *spasmodic* or *paralytic*, depending upon r paralysis of the muscular fibres of the bronchial tubes. 3. due to an abnormal state of the blood or circulation. 4. *Dia- tic*, associated with spasm of the diaphragm and other respi- uscles. Only *bronchial* and *diaphragmatic* asthma need be dis- the present chapter.

I. BRONCHIAL ASTHMA—SPASMODIC ASTHMA.

OGY.—It is not improbable that in some instances there is a condition of the bronchial tubes leading to asthmatic attacks. y be the effect produced by certain poisonous gases; and by of the vagus nerve. Ordinarily, however, the paroxysms seem smodic in their origin, being due to spasm of the muscular cited through the nerves, the irritation being either centric, reflex. The causes of spasmodic asthma may be arranged as —1. The complaint may be idiopathic or primary, there being ous source of irritation, and it is then sometimes distinctly 2. Direct inhalation of certain materials is a frequent cause, such as fog or smoke; different gases and vapours; dust; emanations from animals, or from vegetable matters, esp ipecacuanha, and certain flowers. The conditions of the breathed frequently influence the occurrence of asthmatic a rially, these being especially liable to be brought on by exce or dry air, or by cold easterly winds. Different asthm present remarkable peculiarities as to the qualities of the ai them best, but as a rule a rather moist and relaxing atmos injurious, and that of high and country districts is worse tha districts or of large towns and cities. 3. Asthma is ve associated with bronchitis, bronchial irritation, or emphyse diac diseases may induce true spasmodic asthma, by g pulmonary congestion. 5. Asthma may be gastric in its c ing the taking of food more or less speedily. In some ca of food will bring on a fit; in others only indigestible or sp such as stimulants or sweets. Usually this form of asth upon as being due to reflex irritation, but Dr. Hyde S opinion that it generally depends upon an "offending con blood," brought about by the introduction into the circula terious matters during digestion. 6. Various reflex source may induce asthma, *e.g.*, uterine derangements, hardened rectum, the sudden application of cold to the skin, cold 7. Occasionally it is centric in its origin, as when it accom emotion or hysteria, or, very rarely, organic disease abou the vagus nerves. 8. Irritation of the pneumogastric ne course may in exceptional instances be the cause of asthm

Dr. Berkhart advocates the following view with regard to asthma. He considers it to be a symptom attending all di lungs in which the pulmonary tissue is deficient in elastic frequently accompanies emphysema, when this is fully de during its latent stage of development. In consequenc ciency of the elasticity, the force of expiration is greatly obstacles to the interchange of gases are overcome only l and unusual efforts. Such obstacles are:—1. Hyperæmia o membrane causing occlusion of the bronchial tubes, from influences and the inhalation of foreign bodies. 2. Inf the mucous membrane, followed by the production of th sputa. 3. Compression of the bronchial tubes. 4. Inters 5. Embolism of the pulmonary artery.

Predisposing causes.—A large number of cases commen first ten years of life, and they increase in frequency fr (Salter). Men suffer much more than women. Heredita tion appears to have some influence.

SYMPTOMS.—In some cases premonitory indications of of a fit are observed, especially in connection with the ne Occasionally there is an abundant discharge of pale watery may be gradually increasing dyspnœa and other chest sy variable period before the actual attack. In many cases, is quite sudden in its onset, coming on without any warnin in the great majority of cases early in the morning, especi to three o'clock, but meals, the recumbent position, effo

es may determine the time of its occurrence. In many
distinctly periodic tendency is noticed, which may be re-
miform, and either associated with some evident cause

s of a paroxysm.—The patient has an extreme sense of
nd want of breath, with tightness and oppression across the
ns every article of clothing; and seizes upon every means
g fresh air. The position assumed varies in different cases,
ither sitting, standing, or kneeling, and fixing the hands or
some support; many change their attitude frequently.
ratory efforts are made, every muscle being called into action,
s raised, and the head thrown back with the mouth open,
ently the sweat often pours off the upper part of the body.
breathing is frequently not increased, but inspiration is very
, and jerky, expiration greatly prolonged, often terminating
en effort at expulsion, and being immediately followed by
y act. Respiration is noisy and wheezing. Soon there are
loading of the venous system and non-aëration of the blood,
ecome very marked, the extremities being cold, and the
and quick or sometimes irregular. The duration of the
s greatly in different cases, and it may go on for a long
missions or intermissions. The length of the fits is often
uniform in any particular case. The attack ends either
gradually, this depending much upon its duration, and
s allowed to run its course or is checked by some powerful
rally a cough sets in towards the close, followed by a small
xpectoration, in the form of little pearl-like grey pellets of
ome cases the expectoration is considerable and continues
ne, especially if the paroxysm is prolonged, and then the
med "humid." Occasionally hæmoptysis occurs, usually
ometimes abundant.

igns.—During a paroxysm of asthma the physical signs
acteristic, as evidencing constriction of the bronchial tubes
nce with the passage of air. 1. The chest is frequently
lungs being inflated. 2. Expansile movements are greatly
bsent, and the intercostal spaces, supra-sternal and supra-
sæ. and the epigastrium sink in markedly during inspiration.
of the movements is altered as already described. 3. Per-
d is extra-resonant, and inspiration or expiration produces
on it. 4. Auscultation discloses feeble or absent breath
the tubes are constricted; loud puerile sounds where they
dry râles in every conceivable variety. At the close some
ay often be heard. Important characters as regard these
signs are, that they are frequently limited in their extent,
ly liable to change their place rapidly. Upon the sudden
spasm an exaggerated breath-sound may be heard where a
re there was none at all. Usually both lungs are affected,
ally only or chiefly one of them, and then breathing is in
unaffected side.

e intervals.—This will depend upon whether the asthma is
anic disease or not. Immediately after an attack there is

usually a feeling of exhaustion, with uncomfortable sensations abou chest; but when these pass off patients generally feel relieved, and e an immunity from further paroxysms for a time. As a case progres the fits tend to become more frequent but less severe.

It is necessary briefly to allude to the variety named "hay-asth or "hay-fever." This appears to be due to idiosyncrasy, being c observed in particular subjects, who suffer every hay season, often w out any evident exposure to the exciting cause. The same effects m be produced by breathing the powder of ipecacuanha. The sympto are those of coryza and bronchial irritation, attended with severe coug short asthmatic attacks, especially at night, as well as much languor a a sense of depression and want of energy, but no pyrexia. They set speedily, and last a variable time.

DIAGNOSIS.—Bronchial asthma is sufficiently characterised by t paroxysmal and usually sudden nature of the attacks; their pecul characters, severity, duration, and often sudden termination; the phy cal signs of temporary constriction of the bronchial tubes, but not fluid in them; the effects of treatment; and the complete or compa tive absence of dyspnœa in the intervals. It has chiefly to be dist guished from emphysema, bronchitis, and cardiac dyspnœa, but it mu be remembered that asthma may complicate these. It may also resemb laryngeal asthma.

PROGNOSIS.—The immediate prognosis is favourable, death durin a fit of asthma being a rare event. The prognosis as to recovery more hopeful if the patient is young; if the attacks only come on long intervals, and are not severe or prolonged; if in the intervals th patient is well, and there is no organic disease; and if the paroxysm can be traced to some obvious cause, which may be avoided. Th history of the progress of the case will give some aid in arriving at prognosis.

TREATMENT.—1. *Prevention of an impending attack.*—In those cas where there are premonitory signs of a fit of asthma, it may be possib to avert this by drinking strong coffee; removing every source of irrit tion; heating the body, or in some cases applying cold to the back smoking stramonium or belladonna; and various other remedies.

2. *Treatment during the paroxysm.*—Any obvious exciting cause mu be at once removed; thus a loaded stomach or rectum will require a emetic or enema; as much fresh, dry, warm air as possible must b obtained; and everything that can obstruct the breathing should b loosened. The position of the patient needs to be studied; the sitti or kneeling posture is usually the best, with the elbows supported so a to raise the shoulders.

The remedies recommended for asthma are exceedingly numerou chiefly belonging to the class of depressants; sedatives and antisp modics; or stimulants. Different cases are relieved by totally differen treatment, and at first it is quite an experiment as to what will suit bes but patients learn by experience what gives them most speedy relie The chief remedies which may be of service when given internally ar depressing emetics and nauseants, especially ipecacuanha or tart emetic; tincture of belladonna, conium, hyoscyamus, datura stramoni or tatula; opium or morphia; ether; tincture of lobelia in gradual

g doses, frequently repeated ; cannabis indica ; strong hot
ithout milk or sugar, taken on an empty stomach ; some spirit
ling water in equal parts ; or fragments of ice rapidly swallowed.
ns are most valuable, some of them being directly inspired ;
ing smoked, either in a pipe or cigarette. The most import-
dies for direct inhalation are ether, chloroform, or a mixture of
itrite of amyl, which has been strongly recommended by
urd Jones of Brecon, but must be very cautiously employed ;
hite fumes which arise from ignited nitre paper. The prin-
stances smoked are tobacco, stramonium, belladonna, or a
f these, and great relief is often thus obtained, but of course
must be exercised in conducting this mode of treatment. Sub-
injection of morphia is beneficial in some cases.

s other measures prove beneficial in some instances, such as
old or heat to the surface of the chest ; ice to the spine ; warm
turpentine fomentations ; sinapisms to various parts ; putting
and arms into warm water ; a warm foot-bath with mustard in
ter being drunk at the same time ; or a weak galvanic current
course of the vagus nerves.

atment during the intervals.—At this time the main points to
re to study the locality which suits the patient best, as regards
es of the air and other conditions ; to pay strict attention to
of the alimentary canal and to the diet, as well as to
ons generally ; and to avoid everything which is known
n an attack of asthma. In many cases the habitual use
f the remedies already mentioned may ward off the fits,
oking tobacco or stramonium, or inhalation of the fumes of
or chloroform. If any organic disease is present, this must
accordingly. A course of quinine, strychnine, or some
nic is very serviceable in many cases. Galvanism or counter-
long the vagus nerves ; the inhalation of compressed air ; and
er measures have been advocated.

egard to hay-asthma, it is necessary to avoid the cause of this,
ea-side seems to offer the best protection, or if possible a
uld be taken. During the attack small doses of hydrocyanic
incture of lobelia or other antispasmodics may be given at
tervals. Weak inhalations of creosote or chlorine have been
ded ; and also injection of quinine into the nostrils. As pre-
asures, the administration of quinine and iron, arsenic, nux
strychnine, and other tonics might be tried, along with cold
Dr. Reynolds found the systematic inhalation of a few drops
rm useful.

II. Diaphragmatic Asthma.

of asthma has been described, supposed to be due to spasm
hragm and other muscles of respiration, and having the fol-
racters. The respirations are diminished in number, and the
breathing is limited to expiration, which is greatly prolonged,
being short and abrupt, while but little air enters the lungs.
inal muscles become rigid and hard, and may cause expulsion

of the urine and fæces. There is much distress, and signs of immin suffocation may appear. Should the spasm subside, this is not follow by cough or expectoration. Physical examination reveals distension the lungs, undiminished during expiration. There are no dry râl such as are heard in spasmodic bronchial asthma. I have seen sym toms very similar to those described come on after an immoderate fit laughter.

CHAPTER XIII.

ATELECTASIS. APNEUMATOSIS. PULMONARY COLLAPS PULMONARY COMPRESSION. CARNIFICATION.

THESE terms all signify conditions in which the lungs are to a greater less extent merely devoid of air, so that the affected portions are usel for respiratory purposes. *Atelectasis* strictly refers only to lungs more less in their fœtal condition, not having expanded properly. The oth terms indicate a return to this condition, either from collapse in co sequence of air being prevented from entering the vesicles through t bronchi; or as the result of external compression of the lung.

ETIOLOGY.—1. *Collapse.*—The results of experiment and observati show that the ultimate effect of complete and continued obstruction narrowing of a bronchial tube from any cause is collapse of the vesic which it supplies. The explanation of this is as follows:—The bron become smaller as they divide, and the air drawn in during inspirati drives on any obstructing material, so that at last it reaches a poi where it causes complete closure, and thus no air can enter the vesicl During expiration the obstructing plug is forced out to some extent, a a certain quantity of air escapes, but it again returns with inspiratio acting in fact like a "ball-valve." Thus, as no new air enters t vesicles, and that previously contained in them is gradually expelle they finally collapse entirely. It is supposed also that some of t imprisoned air may be absorbed. In the great majority of cases t obstruction is associated with bronchitis, either simple or complicat measles, hooping-cough, or croup, especially if its products are ve tenacious and viscid, but they need not be of this character. I fants are extremely prone to suffer from collapse, and this condition especially frequent during the first year of life, and in children who a ill-nourished or rickety. Among the chief predisposing causes are yielding condition of the chest-walls and a weak state of their muscle inability to cough and expectorate; distension of or pressure upon t abdomen, preventing the movements of the diaphragm; and the p vious existence of atelectasis.

When pressure is exerted on a main bronchus, as by an aneurismal other tumour, the whole lung may ultimately become collapsed.

2. The chief causes of direct *compression* of the lung are accum tions of fluid or air in the pleural cavity, or agglutination of its s

at pericardial effusion or cardiac enlargement; intrathoracic or aneurisms; deformities of the thorax; and excessive abdo- largement, from ascites, ovarian tumours, enlarged liver or datids, or other conditions.

MICAL CHARACTERS.—The appearances in atelectasis and re very similar. Usually distinct lobules are involved, scat- ugh different parts of the lungs. The margin of the bases, e-like prolongation of the left upper lobe, and the middle lobe ht lung, present collapsed lobules most frequently; and next of the upper and lower lobes on both sides. Superficial much more commonly affected than those which lie deep in

aracters will vary according to the duration of the collapse, mount and conditions of the blood in the affected lobules. ere is congestion, but soon the blood coagulates in the vessels ndergoes changes, becoming decolorized, firm, and contracted, s being finally obliterated. The walls of the alveoli after a re together, and catarrhal pneumonia is frequently set up. As he surface of the lung, the collapsed portions have a well- tline, and are usually sunk below the surrounding level, but . Their size depends upon that of the bronchus obstructed. r varies considerably, ranging from deep-purple to light-red, usually dark-red or of a somewhat violet hue. Whitish e evident on close examination, indicating the divisions into ules. A section is quite smooth, but varies in colour, and it collapsed part to be somewhat pyramidal in shape, with the rds. The tissue is quite airless and non-crepitant, usually of nd firm consistence, and when situated in a thin margin the portion may be felt between the finger and thumb. Pieces ter. The affected lobules can usually be inflated to a greater ree by means of a blowpipe introduced into the communi- nchus, and they then enlarge, assume a light-red colour, and semble normal lung-tissue, but they soon subside unless the s tied. In proportion to the degree of congestion will be the olour, bulk, firmness, and difficulty of inflating the collapsed In course of time they become paler, looser but tough in nd cannot be expanded, as the walls of the vesicles adhere. proceeding to them will usually be found to contain some secretion. Other parts of the lungs are frequently the seat ema.

ssion drives the air and blood out of the lungs to a variable d the appearances differ accordingly. When only the air is the blood remaining, the lung-tissue is dark-red, moist, but nd dense, and this is the condition known as "carnification." becomes grey; anæmic, but pigmented; dry; of a tough nsistence; and incapable of insufflation.

MS.—Dyspnœa, with quick and shallow breathing; feeble and cough; signs of deficient blood-aëration; and marked l exhaustion are the phenomena attending pulmonary collapse, rity being necessarily in proportion to the extent of the d the rapidity with which it is set up. Death is a very frequent termination in children, and may take place speedily or grad The *physical signs* are :—1. Those of inspiratory dyspnœa, the falling in more or less. 2. Dulness over the affected parts. 3. or bronchial breath-sounds. In many cases, however, there physical signs whatever, and they may be obscured by emph bronchitis, and other morbid conditions.

Considerable compression may exist without any symptoms, produced gradually. In this condition a few dry crepitant rål sometimes be heard at the close of a deep inspiration—*comp rhonchus;* and the heart is often unduly exposed.

PROGNOSIS.—Extensive collapse is exceedingly dangerous in c especially if very young, feeble, and placed under bad hygieni tions; it adds greatly to the fatality of bronchitis, hooping measles, and croup.

TREATMENT.—When collapse is suspected during an attack chitis in children, the main objects in treatment are to assist the breathing and the discharge of the obstructing secretion. Frict oil over the chest, as recommended by Dr. Graily Hewitt; respiration; the application of sinapisms; an emetic of sulphat or ipecacuanha; and the administration of expectorants, consti chief measures which are of use. A warm bath is of service occa The diet must be carefully attended to, and much support is quired, adapted to the age of the patient; stimulants are also fr useful. If there are signs of apnœa, the warm bath with the col should be tried. As regards compression, the removal of its speedily as possible is the chief indication.

CHAPTER XIV.

PHTHISIS—PULMONARY CONSUMPTION.

UNQUESTIONABLY several distinct affections are included un term, all of which, however, tend to produce similar results, solidation followed by destruction of the lung-texture; and wa the blood and tissues of the body. In this work little more done than to give an outline of the main facts bearing upon and of the principal views entertained, more especially as reg pathology of the disease.

ETIOLOGY.—*Hereditary or family predisposition.*—There can doubt as to the existence of an inherited tendency to phthisis, proportion of cases in which this is apparent has been very di stated by different observers. Further, many consider that *diathesis* is thus transmitted, whereas others believe that it is *constitutional debility*, and that this may be present in children parents in a low state of health from any cause, as well as derived from consumptive parents. Dr. C. T. Williams has a the following conclusions on this subject :—1. Family predis

curs more commonly among, and exercises a more decided influence
females than males; and the former have a greater power of trans-
sion than the latter. 2. Fathers transmit more frequently to sons,
mothers to daughters, than the converse. 3. Family predisposition
s not directly shorten the duration of the disease. 4. It precipi-
s the onset of the disease, and thus shortens the duration of life.
Most cases are met with from 20 to 30 years of age. The disease
ot often observed during early childhood or in advanced age, but
come on at any period of life. It is more rapid in its progress
lly in the young. *Constitutional condition.* Persons who are feeble
delicate are most liable to be affected. *Occupation.* Phthisis is
common among those whose employment exposes them to various
nt inhalations; to causes of cold; or to the influence of certain
ourable hygienic conditions. *Habits.* Sedentary habits and want
ercise, intemperance, masturbation, excessive sexual indulgence,
lebauchery generally, are the chief causes of phthisis coming under
read. *Diet and digestion.* The mal-nutrition resulting from an
fect supply of nutriment to the system from any cause has a
rful influence in developing phthisis, especially in the young. This
be associated with an insufficient amount or improper quality of
or with a want of power of assimilation on account of dyspepsia
arious diseases interfering with digestion. Some observers have
great stress on a deficiency of fat in the system as a cause of
sis, either from its not being supplied, or because it cannot be
ed. *Interference with respiratory functions.* The want of ventila-
nd fresh air, and consequent breathing of an impure atmosphere,
ially assist in the production of phthisis; hence it is so common
g those whose occupation compels them to remain in a close con-
room for many hours during the day, as well as in many instances
g the night, such as sempstresses or tailors. It is also frequent
ventilated institutions where many persons are gathered together,
ally children, *e.g.*, orphan-asylums and prisons. Whether inter-
e with the respiratory movements due to pressure of stays or
e has any effect in the production of phthisis, is a matter of dis-

Dr. McCormac attaches great importance to "rebreathed air"
cause of consumption. *Climate and locality.* Dampness of soil
abundant moisture in the atmosphere have been proved to be
ful predisposing causes of phthisis. It is most prevalent in those
tes characterised by rapid changes of temperature, or prolonged
with damp. The true tubercular form is said to be favoured by a
temperature. Elevated regions are remarkably free from phthisis,
those which are low present a large number of cases. It has been
l that malarial districts are comparatively free from the disease.
l causes. Severe mental depression, as from anxiety, grief, or over
, certainly seems to have considerable influence in some cases.
sis is not uncommon among the inmates of lunatic asylums.
us and existing diseases. Phthisis may follow measles, hooping-
, croup, typhus, typhoid, scarlatina, and other acute diseases.
ated attacks of bronchitis greatly favour its development; and it
esult from pneumonia, especially catarrhal; pleurisy; and possibly
itis. Under this head may be mentioned miscarriages, bad con-

infection through the breath, but the evidence of such a
is extremely unsatisfactory.

Such are the principal causes which may lead to phth
practicable to divide them into *predisposing* and *exciti*
them may under different circumstances belong to eithe
may be separated into two groups as regards their mode
one tending to induce a low unhealthy state of the co
other to cause local irritation in connection with the pulr
In the great majority of cases several causes have been
often there is a combination of both classes. With rega
diate origin of phthisis, it may or may not be traced to
exciting cause, such as a cold or any other source of pu
tion.

Pathology.—Until within the last few years phthi
universally looked upon as essentially a *tubercular* dise
upon the deposit and ultimate breaking down of tubercle
causing destruction of tissues with the formation of
importance of inflammatory processes in the production
had been recognised by a few observers, such as Addison
others, but it is only comparatively recently that they hav
the prominent position which they now occupy with mar
There is a very wide difference of opinion, however, up
at the present day. Undoubtedly phthisis has different n
and in the following remarks it is proposed to indicate th
in which the consumptive process might arise, in accor
principal views entertained.

1. *Inflammatory forms of phthisis.*—(i.) A comparati
of phthisis result directly from an attack of *acute croup*
especially if this affect the apex of the lung, the inflamm
undergoing caseation instead of being absorbed, and ultin
down, leading to disintegration of the pulmonary tissue.
suggested by Dr. Williams that a continued high tempera
agencies may have the effect of hardening the cells in
lowering their vitality and preventing their development

d. Most cases of *acute* or *galloping consumption* were attri-
him to catarrhal pneumonia complicating extensive acute
s. *b.* From inflammation set up in collapsed lobules associated
chial catarrh, *e.g.*, after measles or hooping-cough. *c.* By
of inflammation due to the inhalation of irritant particles in
cupations into the air-vesicles. *d.* As the consequence of the
of blood poured out into the bronchial tubes, which, instead
expectorated, has remained, become coagulated, and set up
ion.

planation of the destructive changes, as described by Niemeyer,
rs:—Cells, the products of inflammation, accumulate in the
d minute bronchi, crowd upon each other, becoming densely
d thus by their mutual pressure they bring about their own
well as that of the lung-textures by interfering with their nutri-
lveolar walls being also themselves damaged by the inflamma-
s. The morbid materials therefore become caseous, and may
alcification or absorption, or be ultimately discharged, giving
ities.

nt observers have described special forms of pneumonia as
phthisis, which they designate albuminous, scrofulous, tuber-
ous, &c., but Niemeyer denied that the inflammation has ever
ic characters, and affirmed that all varieties may end in caseous
on and consequent phthisis. My own experience is decidedly
of Niemeyer's views on this point.

hronic interstitial pneumonia leads to destruction of the lung,
ready mentioned, this morbid condition is termed "fibroid
It affects to a greater or less extent most phthisical lungs.

hisis from new growths or deposits. The usual new growth or
ich originates phthisis is *tubercle.* Niemeyer held that *primary
phthisis* is rare, and that when tubercle is found in these
ich is by no means always the case in consumption, it is as a
dary to caseous degeneration of some inflammatory products,
ned chiefly in the neighbourhood of these; or, should it be
ome cheesy masses or other sources of infection will be found
arts of the body. He considered that acute deposit of tuber-
lungs is more likely to occur as a primary event than chronic;
ry tuberculosis is observed with greater relative frequency in
are predisposed to inflammation ending in caseous degene-
at the greatest danger for most consumptives lies in their
become tuberculous; and that though tubercle may give rise
nia, this is far less extensive than when the inflammation is
al mischief.

other hand many eminent authorities will not accept these
maintain that the formation of tubercle is the first step in the
ive process in most cases, and that this morbid product under-
nerative changes, at the same time by its irritation exciting
ion; in short, that as a rule phthisis is essentially a consti-
ubercular disease.

not be doubted but that many of the morbid conditions
as tuberculous infiltration, gelatinous infiltration, &c., are not
with tubercle at all, but are inflammatory in their origin.

Under the class of new growths may also be mentioned those rare cases of destruction of lung which are apparently associated with the breaking-down of *syphilitic gummata.*

Having thus considered the *ætiology* and *pathology* of phthisis generally, it will be expedient in the subsequent treatment of the subject to give a separate account of the disease as it occurs in its *acute* and *chronic* forms.

I. Acute Phthisis.—Galloping Consumption.

Anatomical Characters.—Now and then the post-mortem examination merely reveals the remains of an acute croupous pneumonia, which has ended in destruction of the lung-tissue. In more cases there are evidences of extensive bronchitis with catarrhal pneumonia, which may invade large tracts of lung-tissue, the products being soft and caseous and easily breaking down, or irregular cavities of various sizes having formed here and there. The lower lobes are usually most involved. There are signs of more or less pleurisy. In other instances the pulmonary affection is but a part of acute tuberculosis, the lungs in common with other organs being studded throughout with grey miliary tubercles, at the same time being much congested, especially in dependent parts, but not inflamed. In this form caseous masses will frequently be found either in the lungs or elsewhere.

Symptoms.—The clinical history of acute phthisis is that of a febrile disease, attended with prominent pulmonary symptoms, and as a rule with signs of consolidation and destruction of the lungs. It may attack a person previously healthy to all appearance, but this is not usually the case. Hæmoptysis is sometimes the first symptom. The course is in some instances extremely rapid and virulent, but any case of phthisis ending within a few months would be considered acute.

When acute phthisis follows croupous pneumonia, it is indicated by a continuance of the chest symptoms and fever, with abundant sweats and wasting; while the *physical signs* show persistence of the consolidation, followed by softening and the formation of cavities. When associated with bronchitis and catarrhal pneumonia, the local symptoms are pains about the chest; considerable dyspnœa; frequent cough; and abundant expectoration, which may be "rusty." There is considerable pyrexia, especially at night, with much sweating, and often rigors, rapid wasting, and great debility. *Physical signs* at first reveal merely bronchitis. Afterwards there will be indications of consolidation, softening, or excavation in various parts, often most marked towards the bases, viz., dulness; bronchial or hollow breath-sounds; crackling, followed by large, moist, often ringing râles; and increased vocal fremitus and resonance. Pleuritic friction-sound is also heard in many cases.

In the acute tuberculous form the symptoms are those of very high fever, with intense prostration and adynamia, as described under acute tuberculosis; as well as extremely hurried breathing and cough, but no marked physical signs, there being only râles significant of pulmonary catarrh, and subsequently of œdema. There may be evidences of tubercle in other parts.

Diagnosis.—This subject will be again considered; at present it is essary to mention that care must be taken to avoid confounding thisis with certain specific fevers.

TMENT.—According to the nature of the case, the treatment of hthisis will either be that of ordinary pneumonia; extensive rith catarrhal pneumonia; or of acute tuberculosis. Lowering s are not borne, but a supporting and stimulating plan of treat- indicated. If there is high fever, full doses of quinine may be the application of cold cautiously tried. Various symptoms, ain, cough, dyspnœa, hæmoptysis, and sickness, often need . Local applications to the chest, in the form of poultices, s, turpentine fomentations, or blisters, are frequently serviceable.

II. Chronic Phthisis.

MICAL CHARACTERS.—The appearances observed in the lungs c consumption vary greatly in different cases, according to the the destructive process; the changes which have taken place progress; and the other morbid conditions with which it is l. As a rule, but not always, the disease begins and is most and advanced at the apices, the entire upper lobes becoming s involved from above down, and subsequently the lower, so isease is seen at various stages, often retrograding in one part nding at another, while it may be of a different nature in dif- tions of the lungs. In persons who die of phthisis, both lungs r implicated to a greater or less extent, though not equally. se, however, may be limited to one lung, or even to a small f it, and may undergo curative changes, so that when the es from some other cause, evidences of former pulmonary e observed.

mary morbid condition in the development of phthisis is con- of some kind. This may originally present the characters of ry grey hepatization of pneumonia, but only in very ex- cases; of, most commonly, a gelatinous-looking infiltration, mogeneous, and smooth on section, at first limited to lobules, rds involving the pulmonary tissue extensively, and supposed to catarrhal pneumonia or infiltrated tubercle, according to ntertained with regard to its pathology; or of grey miliary ither separate, or, more frequently, in groups. The forma- tubercle is probably in the large majority of cases a secondary t may be primary, and it is produced either in the perivas- hs; in the walls of the air-vesicles; in the mucous membrane chi; or in the adenoid tissue near these.

ency in all these morbid products is to undergo caseation gration to a variable degree and extent, either rapidly or As a result considerable alterations in aspect and other re observed. The affected parts become yellow, opaque, d give rise to the appearances formerly considered charac- llow tubercle. When tubercles become caseous small yellow seen, but these are frequently simulated by a section of a vision or of alveoli enclosing caseous matter. There is no hat complete liquefaction may take place ultimately, followed on or expectoration of the morbid products, and ultimate recovery. Frequently calcification ensues, hard calcareous nodules or masses remaining in the lungs. The further course of phthisis, however, is characterised ordinarily by the continued softening of the morbid materials, which are finally discharged through the bronchi and expectorated, cavities, excavations, or vomicæ being thus originated in the lungs. These vary greatly in number, form, size, and other characters. Often they are of wide extent, in consequence of continued enlargement and coalescence; or several may communicate together in an anfractuose manner. They increase by an infiltration of the walls, which become caseous and disintegrate; or by the formation and destruction of secondary tubercle. Their walls are irregular at first, and they contain generally a purulent-looking substance; or sometimes a dirty, thin, and fœtid liquid. A variable number of bronchi are seen opening abruptly into a cavity, either directly or slantingly, and presenting circular or oval orifices. Obliterated branches of the pulmonary artery may be observed on the walls or passing across the cavity, but sometimes they are not closed, and may be the seat of small aneurismal dilatations or "ectasias," thus greatly increasing the liability to fatal hæmorrhage. Obliterated bronchi and thickened fibrous bands also traverse the space. Niemeyer was of opinion that most of the cavities seen in phthisical lungs are due to dilated bronchi, but it is impossible to agree with this statement.

An important secondary process set up in most cases of phthisis is that indicative of chronic interstitial pneumonia, which materially aids in arresting and repairing the mischief resulting from the disease. This arises in the neighbourhood of consolidations and caseous substances, sometimes forming dense capsules around them or indurated masses; and also around cavities. The latter after a time tend to become smooth and apparently lined by a membrane, should the consumptive process cease; subsequently they may gradually contract and finally close up, leaving only an indurated puckered cicatrix. In some very chronic cases of phthisis the lungs may present nothing but fibroid induration, with cavities in various stages of contraction. It must be remembered that this last condition originates in a different manner from that associated with ordinary "fibroid phthisis."

In addition to the diverse appearances in the lungs resulting from the combination of conditions already described, these are generally further modified by signs of bronchitis, often with ulceration of the mucous membrane; dilated bronchi; emphysematous patches; pulmonary collapse; extravasations of blood; or recent pneumonia. Pleuritic adhesions and thickenings are always evident, especially at the apices, where there is often a dense fibrous cap, half an inch or more in thickness. In these adhesions new vessels form by extension from the intercostals, and thus a communication is formed between these and the vessels of the lungs.

Other structures besides the lungs are generally involved in phthisis, as will be pointed out when considering its complications.

SYMPTOMS.—Chronic phthisis presents considerable variations in its clinical history, both as regards its mode of onset and its subsequent course, but the symptoms bear a general resemblance in the different cases. The disease may commence quite suddenly, as by an attack of optysis; or may remain after some acute affection; or may come on ly, afterwards subsiding into a chronic stage; or may set in ally and insidiously. In the latter case the pulmonary symptoms st observed in some instances, especially those indicating chronic hial catarrh; in other signs of constitutional disturbance or derange- of the digestive organs are noticed at the outset. The symptoms e described as *local* and *general*.

al.—Pains in the chest and sides are common, though not usually . They seem generally to be either pleuritic or muscular, the being often the result of cough. Dyspnœa is frequently present r less from various causes, but may be entirely absent. Respira- re often increased in number, rising somewhat towards evening. ss of breath on exertion is very commonly complained of. Of when the lungs are extensively diseased breathing is much l. Cough is an essential symptom, and may for some time be the e complained of. In its severity and characters it differs widely, t by no means according to the extent of disease. At first it is y and hacking. An abnormal condition of the throat or larynx equently gives rise to cough, in the latter case it being generally e quality. It is usually worse on first lying down at night; after and after meals. A paroxysm is often terminated by vomiting, ly after food has been taken. Expectoration soon occurs in es, but much of the sputa often come from bronchial tubes, e the seat of catarrh. Their characters and amount alter during se of a case, and they present much variety in these respects. hey consist merely of clear mucus, or sometimes small opaque re discharged; subsequently they become muco-purulent; and ities form, irregular, opaque, airless masses are expectorated, less greenish-yellow, which sink in water, and which when d on to a flat surface, spread out in the form of a coin, hence nummulated." This kind of sputum is not characteristic of however, as it may be observed in mere bronchitis. The e mingled with more or less bronchial mucus. In some cases is expectorated, and occasionally a quantity of this is suddenly d, owing to the opening of a cavity. The sputa often have an t odour, and may be extremely offensive, but this is not

In favourable cases, even after large cavities have formed, tion diminishes and may ultimately cease altogether. Exami- the sputa may reveal caseous or calcareous particles. Micro- amination discloses epithelium; abundant newly-formed and pus-cells; blood-corpuscles; numerous fat-granules and s; calcareous granules; vegetable growths not uncommonly; ome instances, fragments of lung-tissues, especially elastic last being a sign of great importance. Sugar may be detected

ptysis requires special notice. It is observed to a greater or in the great majority of cases of phthisis, varying, however, y as regards the amount and exact characters of the blood and the frequency of its occurrence. It may range from s in the sputa to a quantity sufficient to prove immediately ath directly due to hæmoptysis is not a common event in phthisis. When blood is intimately mixed with muco-purulent it has been stated to be pathognomonic of chronic pneumoni hæmoptysis is frequently, but not necessarily, brought on by son ing cause, such as violent cough. In certain cases it tend repeated, and may be almost periodic. When not abundant it s give a patient relief sometimes, but usually the result of hæmo in any quantity or if repeated, is to induce debility and anæm may increase the local mischief.

It is believed by some authorities that the blood generall from the bronchial capillaries, but probably the pulmonary ves its usual source. These have been supposed to be in a state degeneration, and, as already remarked, considerable branch remain unobliterated or be the seat of ectasias, and by their rupt rise to fatal hæmorrhage.

General.—Pyrexia is a very important symptom in phthisis, which should always be looked for by the systematic use of t mometer. This instrument is particularly important in dete early stage of the disease, and indicating its degree of activity. been also stated to aid in determining the nature of the de process, tubercular phthisis being characterised by a more co fever than the other forms. This is a very questionable stateme ever. As a rule marked daily variations in temperature are o and it increases considerably in the evenings. Towards the many cases of phthisis hectic fever in its most typical form is o Night-sweats are complained of in the large majority of cases. tend to come on especially towards early morning, but not unfr they set in as soon as the patient falls asleep, and may be so e as to saturate the bed-clothes, causing much distress and exh Loss of flesh is another prominent symptom, being dependen upon the pyrexia. This must be determined by frequent weighing reliance ought to be placed on the mere statement of the patien emaciation is often extreme, and it is a matter of common obs that it is more marked about the body and limbs, and especi chest, than the face. The fat disappears and the muscles fee and wanting in tonicity. The chest-muscles are often very irrit percussion. More or less anæmia is frequently observed, the being pale, and there may be œdema of the legs from this cau first the blood is generally hyperinotic, but soon it deterio quality. In many advanced cases the skin is dry and scaly. other external appearances which may be noticed are chloasma chest; greyness of the hair in this region; lankiness and fallin the hair generally; bulbousness of the finger ends, with incu cracked nails.

The patient almost always complains of debility, varying in de the most absolute helplessness and exhaustion. The pulse is in in frequency, and tends to be quick, sharp, small, and wanting i

The digestive organs are generally out of order. Loss of a thirst, and dyspeptic symptoms are often complained of. Not monly the mouth, tongue, and throat are red and irritable, thi accompanied with signs of subacute gastritis. In some instan stomach is extremely irritable, retching and vomiting being imm

ed when anything is taken. The breath has in not a few cases a
peculiar odour, which has appeared to me to be quite characteristic.
e close thrush is not infrequent. It has been stated that phthisical
nts have a peculiar dislike to, and difficulty in the digestion of,
substances, but there are many exceptions to this statement. Con-
ion is the rule at first, but later on there is a great tendency to
œa. A red line along the gums and transverse cracking of the
have been described as significant of phthisis, but they are fre-
ly absent and are not at all characteristic.

sumptive patients are inclined to be irritable and fretful. As a
ey are remarkably hopeful, and even when near the end cannot
their condition, but imagine they will recover.

urine is more or less febrile in the early stage, and contains
of products of tissue-destruction. Finally it becomes watery and
nt in solids. Albumen or sugar may be present. The menstrual
ns are often imperfectly performed.

SICAL SIGNS.—The *physical signs* which may be associated with
s are due to:—1. Primary consolidation. 2. Softening of this.
ities in the lungs. 4. Secondary consolidation from interstitial
onia, which tends to produce much induration and shrinking of
sue. 5. Other pulmonary affections, viz., pleurisy, bronchitis,
ema, pneumonia, hæmorrhage into the bronchi, and pneumo-

It has been customary to divide phthisis into three stages,
f *consolidation*, *softening*, and *excavation*, but these are always
r less combined, and in addition evidences of curative changes
uently observed. The extent over which the morbid signs are
d varies considerably, and usually they are present in different
ver different parts of the chest. An important character in
phthisis, however, is, that they tend to be localised, the rule
at they are particularly observed over one or both apices, espe-
front, though not to the same degree. But this is not always
, and therefore it is essential to examine every portion of the
there is any suspicion of phthisis, and also to make frequent
tions in order to determine the progress of the case. It is not
here to describe the physical signs in different stages, but
racteristic of cavities will be pointed out separately. It must
nbered that they will be greatly influenced by the situation,
d amount of the consolidation.

thorax may be congenitally small, either alar or flattened, but
nstances it is in every respect well-formed. At first there may
al depression, or even some bulging, but the tendency is for the
ink in in some part, especially in the supra- and infra-clavicular
considerable portion of one or both sides may fall in. There
wering of the shoulder when one apex is involved. 2. Local
s are more or less deficient, especially that of expansion.
remitus is usually increased, but may be normal or diminished.
ion reveals deficiency of resonance or a rise in pitch, to the
lute hard wooden dulness, with more or less resistance.
clavicles the sound is frequently purely osteal. The area of
sound is often diminished towards the neck, showing that
f the lung is drawn down. The effect of holding the breath

after a deep inspiration will sometimes show deficient resonan
previously it could not be detected. The percussion-sound m
ever, be perfectly normal in phthisis, or even unusually clear
sonant at the outset. 5. Respiratory sounds may be weak to c
extinction; jerky or of "cogged-wheel" rhythm; harsh with pr
expiration; bronchial or blowing. In healthy parts they ar
puerile. 6. The râles which may be heard are those indic
bronchial catarrh or pneumonia; collapse-rhonchus in the nei
hood of the consolidation; and dry crackling followed by moist,
bubbling râles, significant of softening. 7. Vocal and tussive re
are usually in excess. 8. Localised pleuritic friction or creakin
quently observed. 9. The heart may be drawn up consider
uncovered by lung, so that the impulse is extensive and strong,
sounds are loud. The better conduction of the latter towards t
infraclavicular region than the left is a very useful sign of diseas
apex of the right lung. Rarely the heart is lowered. 10.
clavian murmur is not uncommon, especially on the left side
pressure on the artery. 11. The diaphragm and liver are so
drawn up.

Signs of cavities.—These vary considerably according to t
shape, number, and situation of the cavities; as well as the
their walls, their contents, the condition of the surrounding tis
other circumstances. It can be readily understood that vom
exist without there being any or only doubtful evidences of their p
and on the other hand a careless observer might mistak
which simulate those associated with cavities; but cavities in t
may generally be detected when they have formed, and, by care
tion to and study of the *physical signs* present, a tolerably
conclusion may be arrived at as to their exact conditions,
examination from time to time the progressive changes may
excavations being thus often traced in their formation, enla
contraction, and final closure. The following are the import
of cavities:—

1. Percussion-sound may be tubular, metallic, crack-pot, or v
amphoric. A rise in pitch on opening the mouth has been con
characteristic sign of a cavity. 2. Breath-sounds are either bl
more or less hollow, from tubular to cavernous or amphoric.
tion has a peculiar sucking or hissing character sometimes.
chief significant adventitious sounds are large moist râles at th
where there are no bronchi of any size; hollow, metallic, o
rhonchi, varying in size, amount, and quality, being sometimes
rarely metallic tinkling or amphoric echo. 4. Vocal resona
have a ringing or metallic character, and is often greatly in
Pectoriloquy and whispering pectoriloquy are not uncommonly
5. Tussive resonance is often painfully strong and metallic, b
is chiefly useful in that it may cause the breath-sounds to b
heard, by clearing away secretions; or that characteristic
sounds are brought out during the act. 6. The heart-sounds a
times much intensified by transmission through cavities, and ma
a peculiar hollow quality, or be attended with an echo. The
action occasionally produces rhonchi in neighbouring cavities.

ıt a murmur may be heard in rare instances, due to an aneu-
lilatation of a branch of the pulmonary artery.

PLICATIONS.—Numerous symptoms as well as physical signs which
ı the course of pulmonary phthisis are dependent upon the com-
ns so often met with, some of which are due to tubercle in other
The chief of these are:—affections of the larynx and trachea,
ly ulceration; bronchitis, pneumonia, or pleurisy; perforation of
ıra with consequent pneumothorax; enlargement of the external
nt glands or of those in the chest and abdomen; tubercular
:is; ulceration of the intestines, especially the ileum; fatty or
liver; fistula in ano; various forms of Bright's disease; dia-
›yelitis; tubercular meningitis or tubercle in the brain; throm-
the veins of the leg.

SE—DURATION—TERMINATIONS.—The course and duration of
f phthisis are subject to much variety. The disease may pro-
adily from bad to worse, either rapidly or gradually, but more
ly there are intervals of improvement followed by exacerbations.
ses remain apparently in the same state for a long time, while
ven when far advanced, improve and may ultimately become
ly cured. It is sometimes quite astonishing what a length of
ents will remain alive, when apparently in a moribund con-
Death may take place from gradual asthenia and hectic fever;
sis occasionally; some of the complications mentioned, which
aid in the fatal result; or from some intercurrent attack.

TIES.—Different writers have classified cases of phthisis, and
empted to indicate the clinical features characteristic of each
It may be useful to enumerate here the chief forms, and to
: what are the supposed clinical distinctions between certain of
›ugh on this matter much more extended observation is required,
:y often are combined or merge into each other.

arieties may be thus arranged:—

ute. 1. Ordinary pneumonic. 2. Catarrhal pneumonic follow-
chitis. 3. Miliary or tubercular.

hronic. 1. Pneumonic. 2. Catarrhal pneumonic after bron-
This tends to come on insidiously, being preceded by one
›r long-continued attack of bronchial catarrh, or by several
attacks. The thermometer reveals more or less pyrexia. The
s prone to be localised, slow in its progress, and under proper
ıt shows a decided tendency towards cure, with contraction and
›n of the affected part. 3. Hæmorrhagic. Two distinct mean-
e been given to this term. Some merely imply that the disease
menced with spitting of blood, or that this is a prominent and
symptom in its course; others that the hæmorrhage into the
has actually set up phthisis, by exciting inflammation. 4.
This form has already been fully considered. 5. Mechanical.
d as the result of the constant inhalation of irritant particles,
ı has several subdivisions, named according to the nature of the
on or irritation, *e.g.*, miners', colliers', knife-grinders' phthisis;
eous, cotton-phthisis, &c. The progress is slow, the morbid
›eing due to a combination of chronic bronchitis, catarrhal and
ıl pneumonia, though at last true tubercle may form. The ex-

tion, without any corresponding increase in physical
becoming of a more continued type; and symptoms
plication, intestinal ulceration, or tubercle in other
7. Primary tubercular. Here there is no preceding
The patient may be evidently tuberculous, and the cons
affected from the outset, pyrexia of continued type a
marked symptoms. Dyspnœa is often severe, with
but there are no adequate physical signs. Afterwa
evidences of inflammatory consolidation and destructi
not to the same extent as in other forms. Soon there
laryngeal phthisis, ulceration of the bowels, tubercu
meningitis, or other complications. The progress i
8. Syphilitic. I merely mention this as a possible v
but very little is positively known about it.

Some authorities recognise other varieties, such as s
drunkards' phthisis, &c. Among the cases which hav
observation, none have occurred indicating any such
the disease.

Diagnosis.—The diagnosis of phthisis involves not
tion of the presence of the disease, but also as corre
possible of its seat and extent, its stages in different p
and its nature and origin. These questions can on
by a careful consideration in each case of the history,
symptoms, both local and general; and by thoroug
physical examination. This subject will be considered

Prognosis.—Those who wish for full information
matter will find it in the valuable work of Dr. Pollock
The ability to form a reliable prognosis in phthisis c
be acquired by much experience and observation. Th
evidence to prove that phthisis may in many cases un
cure, while in a large proportion its progress may be
appropriate treatment, and life rendered fairly comfo
cult to lay down any average duration or mortality.
much under different conditions. In endeavouring to

either in extension of the disease or in the tendency to softening and destruction of tissues, are very unfavourable; on the other hand, if the disease is chronic or at a stand-still, or if, should a cavity have formed, there are indications that it is drying up and contracting, the prognosis s much more hopeful. Signs of considerable local consolidation and induration from interstitial pneumonia are often favourable, as showing cessation of active disease and the advance of healing processes. 3. *Origin and nature of the disease.* Tubercular phthisis is extremely serious; when it follows bronchial catarrh or is due to certain obvious external causes, from the influence of which the patient can be removed, there is a far better chance of recovery. 4. *Constitutional condition and hereditary predisposition.* Phthisis is more dangerous if the patient is feeble and delicate, but especially if there are evidences of the existence of a tubercular or scrofulous diathesis, or if there is a strong hereditary tendency to phthisis. 5. *Local symptoms.* Continued dyspnœa; harassing cough; profuse expectoration; and severe or repeated hæmoptysis are bad indications. 6. *General symptoms.* Phthisis s dangerous in proportion to the degree of fever; rapidity and weakness of pulse; debility and incapacity for exercise; emaciation and night-sweats. If the general condition shows signs of improvement, the pyrexia ceasing and flesh and weight being gained, the prospect is much more hopeful. 7. *State of the digestive organs.* Inability to take food or to digest it is a most serious drawback in phthisis. Cases in which vomiting is a prominent symptom are also exceedingly unfavourable. 8. *Diet and hygienic conditions.* Deficient or non-nutritious food and improper hygienic conditions greatly increase the evils of phthisis. This is constantly exemplified among the out-patients at Brompton Hospital. Many of those who become in-patients revive wonderfully, as the result of the improvement in their diet and surrounding circumstances. 9. *Complications.* Many of these seriously increase the gravity of the prognosis.

The question is often asked in advanced cases—How long is the patient likely to last? It is useless to attempt to give more than an approximate opinion on this point, it being so uncertain. The appearance of thrush is generally a sign of the "approach of the end." Another question refers to the effects of pregnancy. Usually this condition seems to delay the disease for a time, so far as I have observed; but after parturition it generally advances with increased rapidity. Marriage of persons decidedly phthisical should certainly be opposed.

TREATMENT.—The ultimate objects to be kept in view in the treatment of phthisis are:—First, its prevention and arrest; secondly, its cure; or, failing these, thirdly, palliation of symptoms and prolongation of life. Every case requires thoughtful consideration, and it must not be imagined that this is a disease capable of being controlled by any one remedy or class of remedies. An essential part of the treatment, however, is that which has for its end the maintenance and promotion of a state of general good health and constitutional vigour.

1. *General hygienic and dietetic treatment.* This is of the utmost importance, both for prevention and cure, and without it all other measures are frequently unavailing. The chief things required under this head are a healthy residence, on a dry soil, in a suitable climate,

will be separately considered. It is often requisite occupation of the patient, and to change this, should confinement in a close room with deficient exercise, exciting causes of lung diseases. At the same time if possible, be relieved from undue mental labour amount and character of the exercise to be adopted ent cases, but as a rule such exercises as aid in the chest are to be recommended, especially in young pa must be kept within proper limits. Walking and rid if these cannot be endured, passive exercise is to patient being driven out daily when weather permits, proper supply of fresh air may be obtained. At th fatigue must be avoided. Certain acts which call muscles of respiration are often beneficial if duly regul deep inspirations, reading aloud, or moderate singin interferes with the freedom of the respiratory moveme of tight stays or a bent position, ought to be forbidde valuable article of diet, and some consider asses' or g efficacious. Whey has also been well spoken of. little wine or beer is very beneficial.

2. In all cases where there is any fear of phthis tion should be paid to the slightest indication of p Should the complaint be acute in its origin and o nature, the measures already mentioned when treatin forms of pulmonary inflammation must be had reco any acute exacerbation should receive immediate a very important in most cases to avoid lowering me serve the strength as much as possible, rest in bed be course everything which is likely to excite irritation i the lungs must be strictly guarded against.

3. Before proceeding to the active treatment of an

4. Various tonic and other medicines which improve the condition of the general health and of the blood are very serviceable in phthisis. Of these the principal are the dilute mineral acids—nitric, hydrochloric, sulphuric, or phosphoric; quinine; different preparations of iron, especially if the patient is anæmic; salicine; strychnia; and vegetable bitter infusions or tinctures, such as those of gentian, calumba, chiretta, quassia, or cascarilla. These may be given in various combinations.

5. Among the many special therapeutic agents recommended for phthisis, *cod-liver oil* holds the first position. Almost universal experience has testified to its good effects in this disease. It is needless to enter here into the question of its mode of action, but certain matters of practical importance as regards its administration must be mentioned. Only a small dose should be given at first, not too often repeated. A teaspoonful once or twice a day is sufficient to commence with, the dose being increased by degrees to a tablespoonful three times daily. It is seldom desirable to exceed this quantity. Most patients take the oil best immediately or soon after meals, and if it tends to disagree, lying down for a short time after taking it will not unfrequently prevent any ill effects. Some can manage it best when going to bed at night. It is always well to make use of some vehicle for administering the oil, even when it can be taken alone, but the quantity of this should not be large. It may in many cases be given with the mixture, if this is of a bitter or acid nature; or with steel wine. Milk, orange wine, frothy stout or ale, or a little cold brandy and water, are among the most useful vehicles. When the oil repeats or causes sickness, it is often well borne when given with lime-water and milk in equal parts, some of which may also be drunk after it. Small doses of strychnine have been found very useful in preventing the nauseating effects of the oil. It is most important to look to its quality, especially at the outset, otherwise a patient may get an unsurmountable antipathy to it. Different varieties are preferred by different practitioners. A good pale oil seems to answer best generally; many patients like De Jongh's pale-brown oil very well. Regularity and perseverance in the use of the remedy are essential in order to realize the effects it is capable of producing. During its administration the diet must be carefully attended to, and should not be of too rich a character. If from time to time it appears to disagree with the digestive organs, it may be temporarily omitted, especially during the warmer months. It has been recommended to introduce cod-liver oil by inunction or enema, but though necessary under some circumstances, these modes of administration are objectionable as a rule. Inunction is often advantageous in children. Several preparations containing cod-liver oil have been made, such as the etherised oil, or a combination with quinine, hypophosphite of lime, and other remedies.

Numerous substances have been advocated as substitutes for cod-liver oil, but they are far less efficacious. The chief of these are olive-oil; skate, shark, or dugong oils; cocoa-nut oil; dog's fat; glycerine; and cream. The last two certainly produce good effects in some cases.

Space will only permit the enumeration of some other special remedies recommended. The principal are pancreatic emulsion; hypophosphites of lime, soda, and iron; phosphate of lime; extract of malt; iodide of potassium; *sulphurous acid* and sulphites; arsenic; koumiss.

These have been very differently reported upon by different ol and though most of them are useful in certain cases, they ar means to be looked upon as specific remedies.

6. *Local treatment.*—Applications to the chest are decidedl in many cases, either for the relief of symptoms; the subdual of matory processes; or possibly they may have an immediate e some forms of phthisis. The most useful are small or flying applications of iodine, more or less powerful; and liniments o oil, turpentine, or acetic acid. Local removal of blood is decid seldom desirable. In acute exacerbations fomentations and p are often required. In some cases the application of strapp parts of the chest, in order to procure mechanical rest, has a b effect as regards the progress of phthisis.

7. *Treatment of symptoms and complications.*—Various sy frequently need attention during the course of a case of phthisi is impossible to do more here than point out their nature, and the indications for their management, most of them being consi detail in other parts of this work. Pyrexia must be subdued, e if it is inclined to be high. Quinine in full doses with digitalis given for this purpose. Dr. C. Theodore Williams has found cc beneficial in some cases. Debility and wasting will be counter the general treatment already described, as well as by subdu fever. When there is much exhaustion, considerable quantities holic and other stimulants are required. For night sweats t remedies are oxide of zinc, gr. ij—v, in the form of pill or given at night; tincture of belladonna, or subcutaneous inje atropine; or a full dose of quinine or gallic acid. In some case found that the night sweats were best checked by the administr a few days of a mixture containing quinine, alum, and dilute s acid. Sponging the upper part of the body carefully with vine water is sometimes useful. Pains about the chest are often rel the local applications already mentioned, or by wearing some or warm plaster; in a large number of cases much pain in th complained of from time to time, either muscular or pleuri this is almost invariably at once relieved by strapping the s perly, as described under pleurisy, which is the plan of tre always adopt under such circumstances. Cough is often a most some symptom. It is by no means always desirable to stop i management must be guided by the amount of expectoration, charge of which is to be encouraged or its amount diminished l dies mentioned under bronchitis. In most cases cough need relieved, and it is always advisable first to look to the state of th and larynx, as cough is very commonly due to some unhealthy c in these parts. Local applications of tannin or chlorate of po various astringent gargles or lozenges are often most beneficial. cough is irritable, anodynes are valuable, especially opium, codeia, hydrate of chloral, croton-chloral, bromide of am conium, belladonna, or chlorodyne, some of which may be co These are best given in the form of lozenges, syrups, or linctu it is desirable to make all cough mixtures as small as possibl dyne and other inhalations are in many cases extremely service

not for any curative influence upon the disease. They are particularly useful if the larynx is affected. If the expectoration is fœtid, disinfectant inhalations should be employed. Weak iodine inhalations are sometimes decidedly beneficial. Dyspnœa and hæmoptysis must be treated according to the ordinary principles. Vomiting is sometimes a very distressing symptom; if the ordinary remedies fail, small doses of strychnia should be tried, and its effects are in some cases most satisfactory. Diarrhœa, if due to ulceration of the bowels, is frequently very difficult to check. Carbonate of bismuth, gr. v—x, with Dover's powder, gr. iij.—v, is often a useful combination; but enemata of starch and opium are most to be relied on. Other complications must be attended to as they arise.

8. *Change of climate and sea-voyages.*—This is a most important subject in connection with the treatment of phthisis, and for detailed information the reader is referred to the writings of Williams, Walshe, Henry Bennett, and others. In selecting a suitable climate, the chief points to be observed are that it is not liable to either extreme of temperature; that the air is pure and not too moist; that the soil is healthy and that there is no likelihood of sudden changes, exposure to cold winds, or continued unfavourable weather. It is always well also to choose a place rendered attractive by bright sunshine, pretty scenery, and pleasant company. One most important object in selecting a climate s that the patient may be enabled to be out in the open air as much as possible. The salutary influence of high altitudes upon phthisis has been well established, and some recommend a residence in mountainous districts, even during the winter. It is questionable, however, whether his is desirable, but patients should rather reside in some warm and heltered place during the colder months, and go to a high and dry egion during the warm season. The exact qualities of the climate which are suitable for any individual case will depend upon its mode of origin, and the conditions of the bronchial mucous membrane. Those cases which are of constitutional origin are particularly benefited by a ojourn in lofty regions. The principal sea-side places suitable for phthisical invalids are the Isle of Wight, especially Ventnor, Bournemouth, Torquay, Hastings, St. Leonards, Penzance, Worthing, Sidmouth, Southport, Grange, Clevedon, and Tenby, in this country, where the emperature is moderate, but moisture considerable; Mentone, Nice, San Remo, Palermo, Cannes, Malaga, Malta, or Algiers, where there is a high temperature, with but little moisture; Madeira, West Indies, and he Azores, where both temperature and moisture are considerable. Among inland regions, Pau, Pisa, Upper Egypt, Syria, Australia, and cerain parts of South Africa are recommended; or if elevated districts are desired, the Alps, Andes, Himalayas, or Mexican mountain ranges afford he requisite conditions.

Long voyages, especially to Australia or up the Mediterranean, are most useful in many cases, but they should not be recommended if the disease is too far advanced.

A large number of patients are unable to avail themselves of the benefits to be derived from a suitable climate, though, thanks to the various hospitals established in many sea-side places in this country, hese advantages are more widely disseminated than they were formerly. f during the winter months patients are prevented by circumstances from residing in a proper climate, they should keep indoors as much as possible in bad weather; avoid every cause of cold; and wear a respirator. Men should allow the beard and moustache to grow. The treatment of consumption by mineral waters, compressed air, inhalation of oxygen, and other special methods, does not seem to have been attended with much success.

CHAPTER XV.

CANCER OF THE LUNGS.

ETIOLOGY.—This disease, which is exceedingly rare, is far most common from 40 to 60 years of age; and more males are affected than females. It may be inherited. In the large majority of cases it is secondary, especially to cancer of the bones or testicles, but may result from direct extension, or be primary in its origin. Pulmonary cancer generally extends so as to involve neighbouring parts, but is very rarely followed by secondary cancerous formations in other internal organs.

ANATOMICAL CHARACTERS.—Encephaloid is the variety of cancer usually found in the lungs, and it is often extremely soft, pulpy, and vascular. Other forms are occasionally met with, alone or in combination, and considerable deposit of black pigment may be observed, constituting melanotic cancer.

Secondary cancer assumes almost always the nodular form, and affects both lungs; the nodules vary much in size, and when at the surface tend to be depressed; by their union a lung may be involved throughout. Primary cancer is particularly prone to be confined to one lung, especially the right, and is often infiltrated. After a time the cancerous matter undergoes fatty degeneration and softening, cavities being formed in some cases, and extravasations of blood into its substance are common. The vessels and bronchi are often either involved in the disease or obliterated by pressure. The unaffected portions of the lung-texture may be normal, or various morbid changes are set up. A cancerous lung feels remarkably heavy. Extensive pleuritic adhesions are usually observed.

SYMPTOMS.—Secondary cancer tends to come on insidiously without any subjective symptoms. I have seen a case in which the left lung was involved almost throughout, and the right also extensively, the only symptoms being occasional cough, with shortness of breath on exertion. In primary cancer there is usually pain in the chest, which may be extremely severe, of a lancinating character, and accompanied with tenderness. Cough is usually present, attended in some cases with a peculiar expectoration, in the form of a substance resembling red or black-currant jelly, or occasionally containing cancer elements. Hæmoptysis is very common. Dyspnœa is generally observed, being especially severe if there are projecting nodules pressing on the nerves; or if the cancer is associated with a mediastinal tumour, when there are other signs of pressure on neighbouring structures.

The general symptoms are not usually so marked as might be expected. The cancerous cachexia may or may not be evident; emaciation, fever, night-sweats, and failure of strength are generally present more or less, but they may be comparatively very slight, especially in the secondary form. Wasting is sometimes extremely rapid in its progress when once established.

PHYSICAL SIGNS.—These will vary according to the form, seat, and amount of the cancerous accumulation, and whether it is associated with a mediastinal tumour or not. Where there are scattered nodules, there may only be slight alterations in the percussion and respiratory sounds. If a lung is extensively involved with nodular cancer, being ultimately converted into a mass of encephaloid, the signs are :—Enlargement of the side, with widened and flattened spaces, the surface feeling unusually even, but without any sense of fluctuation; great deficiency or entire absence of movement; weakened or annulled vocal fremitus; absolute dulness, unaltered by position, with great sense of resistance; weakened or absent breath-sounds over a variable area; deficient vocal resonance; displacement of heart or diaphragm, the cardiac sounds being frequently conducted with an unusual degree of intensity. In the infiltrated form the lung is contracted, and physical examination reveals :—Retraction of the side, with depression of the intercostal spaces; deficient movement, the spaces still acting, however; increased, diminished, or absent vocal fremitus, according to the amount of consolidation; hard, wooden, high-pitched, or tubular percussion, which may extend across the middle line; bronchial, blowing, or feeble respiratory sounds; often intensified vocal resonance; displacement of the heart, either towards the affected or opposite side, with intensification of the sounds; and drawing up of the diaphragm. Ultimately there may be signs of cavities. In the non-cancerous parts signs of hypertrophy, bronchitis, emphysema, or collapse, are usually present.

PROGNOSIS is necessarily fatal, death occurring either from local or general causes.

TREATMENT can only be palliative, the usual remedies being employed for the relief of symptoms as they arise.

RARE MORBID FORMATIONS IN THE LUNGS.

It will be only necessary to enumerate certain morbid formations which may possibly be met with in the lungs, viz.: hydatids; sarcomatous, enchondromatous, osteoid, or myeloid tumours; hæmatoma.

CHAPTER XVI.

DISEASES OF THE PLEURA.

I. PLEURISY.—INFLAMMATION OF THE PLEURA.

ETIOLOGY.—*Exciting causes.* These may be enumerated as :—1. Direct irritation of the pleura, from injury; foreign matters which have gained access into its cavity, *e.g.*, pus or air; local deposits in the pleura, *e.g.*, cancer, tubercle; diseased bone; friction or pressure by tumours. 2. Cold or other injurious meteorological influences, though many deny any such mode of causation. 3. Possibly "extreme muscular over-exertion and exertion in continuous public speaking" (Anstie). 4. Extension from neighbouring parts, *e.g.*, the pericardium; under which class of causes may be also mentioned the pleurisy which accompanies pneumonia in most cases, or complicates other pulmonary affections, especially phthisis. 5. Blood-poisoning, in connection with various acute febrile diseases, especially scarlatina, typhoid, puerperal fever, or acute rheumatism; pyæmia and septicæmia; Bright's disease; or alcoholism.

According to its mode of origin pleurisy has been divided into *primary* or *idiopathic* and *secondary*. The former is due to some cause acting immediately on the pleura, the patient having previously been in good health; the latter is the result either of some constitutional affection, or of previous visceral organic disease. In the latter case, however, it is not improbable that the inflammation may in some instances be brought about by a slight exciting cause acting on a depraved constitution, which greatly predisposes to serous inflammations. Of other *predisposing causes* but little is known. Pleurisy may occur at any age. Probably it is most common in the colder seasons.

ANATOMICAL CHARACTERS.—Like other inflammations of serous membranes, pleurisy, if it is at all extensive and runs a regular course, is characterised by the stages of vascularization; lymph-exudation; fluid-effusion; absorption; and adhesion. The costal pleura seems to be first affected as a rule. At the outset the appearances are bright redness from capillary injection, often with spots of extravasation; dryness and loss of polish of the membrane; with thickening, cloudiness, and diminution in consistence. Then exudation covers the surface more or less extensively, varying in quantity and characters, and being usually stratified. A sero-fibrinous fluid begins to accumulate in the pleural sac, in some cases from a very early period, in which float fibrinous flocculi, the amount varying exceedingly, and it may be so abundant as to fill the sac completely. More or less blood may be present, as well as gas, the latter probably being due to decomposition. The epithelial cells of the membrane undergo proliferation, and the newly-formed cells are seen in the exudation and fluid. If the termination is favourable, the effusion is absorbed, much of the exudation is also taken up after undergoing degenerative changes, while the remainder becomes organised into adhesions or agglutinations, these also sometimes developing from papillary vascular growths which arise from the sub-epithelial tissue.

In some cases, owing to an unhealthy condition of the system or excessive formation of cells, the fluid is not absorbed, but remains and becomes more or less purulent. The exudation may also become caseous, and thus lead to the formation of tubercle; or calcification sometimes occurs.

The lung, if not previously consolidated, is first floated forwards and relaxed and then compressed, until ultimately it becomes completely carnified. If the pressure is soon removed, the lung will expand again;

: it is in danger of being rendered permanently useless, or of
ng further destructive changes.

good proportion of cases pleurisy is limited to a very small
ich is covered with a slight exudation, and an adhesion soon
In a few instances I have observed distinct evidence of exten-
ation of lymph, with little or no fluid effusion. Sometimes
n is "loculated" by adhesions. Rarely pleurisy is bilateral,
n generally associated with some constitutional diathesis.

vnic pleurisy is usually meant either extensive adhesion of the
urfaces, with falling in of the side, the result of an acute
or a condition in which the effusion remains and cannot be
. being either serous or purulent, and in either case named
: or where an opening has been formed, through which there is
ent discharge, either externally—*fistulous empyæma*, into the
or very rarely into the bowels. Occasionally the disease seems
onic in its origin, especially when of a secondary nature; under
of cases might also be included those in which there is a ten-
repeated limited attacks.

e is abundant effusion, the neighbouring organs will be found
l. especially the heart in cases of left pleurisy. This is partly
essure; partly to elastic traction on the part of the lung which
act. Dr. Douglas Powell affirms that the axis of the heart can
verge beyond the vertical line, or only to a very slight degree,
he apex does not point to the right, which is contradictory of
ments made by other observers. The right side of the heart
ral venous system are often overloaded.

oms.—In all serous inflammations the symptoms observed are
kinds, viz., first, those directly due to the affection of the mem-
elf and tissues immediately adjoining; secondly, those resulting
mechanical pressure of inflammatory products on neighbouring
d structures; and thirdly, those indicating constitutional dis-

Much variety is presented in the intensity of the symptoms
y, and that by no means always in proportion to the gravity of
. In many instances, which are common enough in hospital
it practice, where the disease is localised in a small patch, the
inent symptom is a "stitch in the side," which may be very
creased by breathing deeply or coughing, and often by pressure,
nt leaning towards the affected side, which is kept as much at
ssible. There are no general symptoms.

al case of acute primary pleurisy with effusion has the following
story. At the outset several chills are generally felt, not severe,
ied or soon followed by certain *local* and *general* symptoms.

—Acute pain is felt, usually in the infra-mammary or infra-axillary
f a dragging, catching, or stitch-like character, increased by
or coughing, and attended with superficial or deep tenderness.
ness of the pain is often evidenced in the expression, posture,
of breathing of the patient. Respiration is carried on in a
hallow, and irregular manner, but there is no actual dyspnœa
nd the number of respirations is rarely above from 30 to 35.
there is evident dyspnœa should much fluid be poured out,
es in its degree, being in some cases very severe. Cough is

generally present, though the patient tries to repress it; it is short a hacking, generally dry, or at least unattended with any particular expectoration. Sometimes it is excited by making the patient sit up or bend forward. At first the patient usually prefers to lie on the affected side but later on there is no uniformity, for it is not uncommon to see patients with one pleura full of fluid habitually rest on the healthy side.

General.—Pyrexia is observed, but it is not very marked, and the temperature has no typical course. The pulse is frequent, varying usually from 90 to 120, full and bounding, but deficient in resistance, as evidenced by the sphygmograph (Anstie). The pulse-respiration ratio altered somewhat, but not to any great degree. There is very little prostration. Disturbance of the digestive organs, headache, and other symptoms associated with the febrile state are present more or less. The urine may be slightly albuminous.

COURSE AND PROGRESS.—In favourable cases the symptoms subside in a few days, and the fluid is absorbed. Should this not happen, the only remaining symptom in many cases is a little dyspnœa. Ultimately the effusion may in time be taken up or discharged through the bronchi o externally, or be removed by operation. In cases of chronic effusion pyrexia often continues, the skin being hot, dry, and harsh, and the pulse frequent but weak. The patient wastes and becomes much debilitated. Œdema of the affected side and extreme clubbing of the finger-ends are sometimes noticed. *Fistulous empyæma* is generally attended with great weakness, loss of flesh, and a tendency to hectic fever. The hair frequently falls off. Ultimately symptoms of tuberculosis may arise. The formation of pus has been supposed to be indicated by repeated rigors, but certainly this is not always the case. Perforation into the bronchi is attended with profuse expectoration of matter Should extensive adhesions form, with retraction of the side, more or less shortness of breath remains, with a liability to pains on the side affected, and more or less debility.

It is very important to notice that extensive effusion may be poured out without there being any symptoms to draw attention to the chest—*latent pleurisy*; and this is especially liable to happen in secondary pleurisy, or when the complaint occurs in children. *Bilateral pleurisy* is necessarily a serious condition, and is attended with dangerous dyspnœa. *Diaphragmatic pleurisy* probably gives rise to very severe pain; and also interferes greatly with breathing.

PHYSICAL SIGNS.—In the early stage of pleurisy the only reliable physical signs are:—1. Diminished movements on the affected side, on account of pain. 2. Friction-fremitus, which is exceedingly rare. 3 Friction-sound, at first slight and grazing, but becoming much louder when lymph is formed. It may be limited to a small spot; or b heard extensively over the side.

The signs attending the stage of fluid effusion are usually quite characteristic, being, however, considerably modified by its quantity and mode of accumulation. Usually the evidences of effusion are first observed over the lower part of the chest, and extend upwards more or less rapidly. 1. The side is enlarged to a variable degree, and the spaces are often specially affected, being either flattened or bulged out. It is important to make use of the cyrtometer in determining this enlarg s the measurement may be actually less on the affected than on lthy side. 2. Movement is diminished or almost completely d. 3. Vocal fremitus is deficient or absent below, in excess there being frequently an abrupt transition from the one condi- the other, particularly in front. 4. Fluctuation may occasionally cted. 5. Percussion sound is dull over the area of the fluid. ing below, the dulness may ultimately extend over the whole side, yond the middle line for some distance. If the patient has d the recumbent posture at an early period, dulness is sometimes l over the whole of the back before any is observed in front. It moveable with a change of posture of the patient, but frequently not the case. In many instances an abnormally clear or tubular can be elicited under the clavicle at a certain stage, and the on from dulness may be quite abrupt; occasionally the percussion mulates crack-pot sound. 6. Breath-sounds are absent or feeble exaggerated or even blowing or tubular above. 7. Friction- may or may not be heard at the margin of the dulness. 8. Vocal nce is diminished or annulled below, increased above, the change ften marked. Ægophony is frequently heard, especially about le of the scapula. 9. Displacement of organs is an important pecially of the heart. Its impulse may be noticed far over on ht side in cases of left pleurisy, and its sounds are very loud here. pulse, however, is probably connected with the right ventricle. phragm, with the liver, spleen, or stomach, may also be depressed. ases have come under my notice in which a cardiac murmur l to be due to displacement. 10. Rarely succussion gives rise to a g sensation or sound, owing to the presence of air in the pleura. rption may be traced by the gradual subsidence of the signs ed, and their restoration to the normal, often accompanied with redux friction-sound, and sometimes with friction-fremitus. s may continue for some time. In favourable cases the side s its proper form and size, and the lung expands. The heart ally remains in its abnormal position, owing to adhesions; or far in the opposite direction; or lies more or less loose in the Should the lung remain unexpanded the signs are:—1. General n of the side, the ribs being crowded together; the shoulder ; all the diameters of the chest diminished, especially the osterior; and the spine curved, usually to the diseased, occa- to the healthy side. 2. Movements null or greatly lessened. ient resonance. 4. Feeble respiratory sounds over the side r; or in some parts of bronchial quality. Fistulous empyæma ed by extreme retraction of the side.

igns of fluid are now and then observed on both sides. On the nd they are limited in the "loculated" variety of pleurisy, ay cause local bulging. The fluid sometimes makes its way to ce, and even points like an abscess; or in rare instances ex- lsation when in the neighbourhood of the heart. Should an a open into the bronchi, râles will be heard over the lung, and s pneumothorax is produced. In diaphragmatic pleurisy there o signs except cessation of all abdominal movements during n.

In children some important modifications of the ordinary signs are noticed. The chest being very yielding, is dilated cons and at a very early period, while the organs are comparatively placed. Bronchial breathing and vocal resonance often pers when the thorax is full of fluid.

Old adhesions resulting from previous attacks may influe signs of pleurisy considerably, as well as lung-consolidations.

TERMINATIONS.—1. Recovery takes place in a large propo cases of pleurisy, after absorption or removal by operation of a the lung expanding fairly, but being more or less adherent. 2. is a rare event in acute cases, unless the pleurisy is bilateral ciated with some serious constitutional or local disease. It may however, from the mere mechanical effects of fluid effusion, panied with pulmonary congestion and œdema, and there is a d sudden death should there be great dyspnœa. 3. Transition into pleurisy is not uncommonly observed. Under this would be incl *a*. Chronic effusion. *b*. Retraction of the side from extensiv sions, with permanent binding down of the lung. *c*. Chronic p discharge, either by an external opening; through the air-passa in some unusual direction, such as into the intestines. In thes the patient may ultimately either sink from gradual asthenia or phthisical; or sometimes recovery follows, though with perman of the use of the lung on the affected side.

DIAGNOSIS.—This subject will be again considered, and here only be mentioned that pleurisy has not merely to be distinguish other affections of the lung or pleura, but that it may be simul first by painful affections of the chest-wall; or in the stage effusion by enlargements of the liver or spleen, hydatids of the li large tumour within the chest. Careful physical examination has to be relied upon in diagnosis.

PROGNOSIS.—This involves not only the immediate result disease, but also its ultimate issue. Primary pleurisy ought to te favourably in the great majority of cases, if properly managed. more serious in proportion to the amount of fluid poured out; t it has remained in the pleura; and its tendency to become p Severe dyspnœa is a dangerous sign. The thermometer and sp graph may be of use in aiding towards a prognosis. Pleurisy sec to constitutional diseases is very grave; also when it occurs in ad cases of chronic alcoholism. Bilateral pleurisy with effusion is sarily most dangerous. The different forms of chronic pleur often unfavourable. Discharge of pleuritic fluid through the l generally a most untoward termination, but I have known som do remarkably well after this event. It must be remembered th pus forms or caseous degeneration is proceeding, there is a da tuberculosis being set up.

TREATMENT.—The activity of the measures to be adopted management of pleurisy must differ greatly in different cases strongly protest against any routine practice of removing blood, ing, and administering mercury in this disease, which, whatever said to the contrary, is even at the present day by no means an mon mode of practice. The ultimate objects to be kept in v merely to save the patient's life, but to restore the parts affected to ormal a condition as possible.

e principles to be kept in view in the treatment of pleurisy are:— o subdue the inflammation and diminish the amount of lymph and poured out. 2. To promote the absorption of these materials as ly as possible. 3. To remove them in some other way if they can- be absorbed. 4. To relieve symptoms. 5. To support the strength e patient.

. The first thing which is attended to in the treatment of inflamma- of synovial, as well as of most serous membranes, is to keep the tures affected in as complete a state of rest as can be obtained. It ars to me that this should also be the primary measure to be kept in in the management of pleurisy. For some years I have been in abit of paying special attention to this matter, by mechanically the side affected, and thus limiting or preventing its movements, am firmly convinced of the beneficial effects resulting therefrom. following is the method which I now adopt for the purpose of ring the desired rest:—Strips of a properly-adherent plaster d on some thick material, from three to four inches wide and of cient length, are applied round the affected side from mid-spine to sternum or a little beyond. These are laid on over a variable t of the chest, according to the requirements of the case, it being etimes necessary to include the whole side. It is best to make the ication from below upwards, and to fix the strips of plaster in an ue direction rather than horizontally. The patient being directed spire deeply, a strip is fixed at mid-spine and drawn tightly, firmly, evenly round the side in the direction of the ribs, *i.e.*, a little quely from above downwards and forwards; then another strip is on over this, also extending from mid-spine to mid-sternum, but in opposite direction to the first, *i.e.*, obliquely upwards and forwards s the course of the ribs; the third is to follow the direction of the overlapping about half its width, the fourth that of the second, and n in alternate directions, until the entire side is included if required. lly it is often desirable to apply over the whole two or three strips ontally, so as to form a superficial layer, and one or two may also be d from behind forwards over the shoulder, these being kept down by er fixed round the side across their ends. The good effects realised is method of treatment, when efficiently carried out, have been these: In cases of limited dry pleurisy, which are very common, especially thisis, as well as exceedingly distressing, it gives almost invariably lete and immediate relief, so that patients can breathe and cough ortably, and are able to follow their occupations without discom- which is particularly important in the case of those who are d to work. 2. It is reasonable to suppose that the quantity of mmatory products poured out will be limited by this condition of I have every reason to conclude that this result was realised in l instances. 3. The rest and pressure may also aid absorption, have found this mode of treatment decidedly efficacious in the al of moderate pleuritic effusion. 4. Occasionally cases of y come under observation, in which there is extensive exudation ph with little or no fluid, and this remains as a chronic condition,

causing palpable fremitus, attended with most unpleasan
The only curative end that can be attained is to bring ab
of the surfaces of the pleura, and strapping the chest will
effect this purpose.

Venesection or even local bleeding is, in my opinion,
required in pleurisy. Calomel is a drug which had bette
except as an aperient. Many cases require nothing but r
attack is severe, the best therapeutic agents at the ou
which lower the cardiac action, such as aconite, veratri
emetic in small doses, which may be given in some s
Opium is most valuable for the purpose of relieving pain
sleep, Dover's powder being a very useful form for admini
morphia may be injected subcutaneously. The applicati
the chest has been recommended.

2. Should there be much effusion—and this is not un
state of things when the patient comes under observation-
irritation over the chest is decidedly beneficial, by mea
large blisters, or the application of iodine liniment. I
several instances in which strapping the side has certain
aid absorption, when the fluid was not in large quantit
which act on the skin, bowels, or kidneys, are those which
to be most efficient in promoting absorption. Full doses
potassium with infusion of digitalis and other diureti
times beneficial. Powerful purgatives are of questiona
should be employed with caution if at all, but the bow
kept freely opened. Repeated vapour or hot-air baths ha
viceable in some instances under my care. Dr. Anstie s
mended tincture of iron, and this is certainly a valua
many cases.

3. A most important mode of treating many cases of
sion consists in the removal of the fluid by *paracentesis*
merly this was regarded as merely a last resource ; now it
looked upon as a legitimate and most valuable method
Many questions connected with this subject are still matt
such as the time at, and circumstances under which the ope
be performed ; the instrument to be employed ; the amoun
removed; and whether it is dangerous or not to allow the
into the pleura. There is ample evidence to prove the
paracentesis, even in acute cases, especially in the treatme
and I can add my personal testimony in favour of this me
late Dr. Anstie's excellent article on Pleurisy, in "Reynol
Medicine," the circumstances under which paracentesis o
formed are summed up as follows :—1. In all cases of ple
ever date, where the fluid is so copious as to fill one pleu
to compress the lung of the other side. 2. In all cases of d
when the total fluid may be said to occupy a space equ
united dimensions of the two pleural cavities. 3. In a
the effusion being large, there have been one or more fits
4. In all cases where the fluid can be suspected to be pus,
puncture must be made ; if purulent, the fluid must be
all cases where a pleuritic effusion occupying as much

nt, such as a little carbolic acid, or tincture of iodine (1 part

chief symptom likely to call for special attention is pain in the not relieved by rest, the best plan is to employ subcutaneous of morphia. If the side is not strapped, hot fomentations, eal poultices, or sinapisms may be tried. Urgent dyspnœa aracentesis usually. Cough must be relieved, if troublesome, ve remedies.

ents suffering from pleurisy need not be kept low as regards stimulants are not to be given at first. If the strength fails, ially in the different chronic conditions, abundant nutritious quired, with wine or beer. Quinine, mineral acids, cod-liver ther remedies of this kind are also very useful at this time.

treatment of secondary pleurisy must be guided by the conh which it is associated. Lowering measures are especially to d in these cases.

II. HYDROTHORAX.—DROPSY OF THE PLEURA.

GY.—Hydrothorax is almost always a part of general dropsy iac or renal disease. It is said to be in rare instances of an d, associated with cancer or tubercle.

MICAL CHARACTERS.—More or less clear serous fluid is both pleural sacs, compressing the lungs. There are none of of inflammation.

MS.—Dyspnœa, with signs of deficient blood-aëration, are the ptoms of this condition, resulting from mechanical interference action of the lungs, and there is generally much distress, ydrothorax is added to some previous serious affection, and oth sides are involved. The *physical signs* are those of fluid pleuræ; not excessive in amount; freely moveable; without und or fremitus; there being no displacement of the heart.

MENT.—As a rule this is merely a part of the general treatment

quantity in the pleura is due to one of the following causes :—1.
of a vessel from injury, or its perforation during operation. 2.
of an aneurism, of which I have seen a most interesting exam
which an aneurism of the aorta between the pillars of the dia
ruptured into the left pleural cavity. 3. Carcinoma of the lung
way into the pleura. 4. Diffuse pulmonary hæmorrhage exten
the surface. 5. Cancer of the pleura itself.

SYMPTOMS.—There is dyspnœa, owing to the pressure of the
upon the lung; with evidences of loss of blood. Death may occ
speedily. The *physical signs* are merely those of pleuritic accum
either liquid or solid.

TREATMENT.—In most non-traumatic cases nothing can be
but to keep the patient at rest. Of course if the bleeding is
injury it is necessary to try to stop it. Paracentesis may poss
required.

IV. PNEUMOTHORAX.—HYDRO-PNEUMOTHORAX.

ETIOLOGY.—1. Pneumothorax of any clinical importance result
great majority of cases from perforation of the lung, owing to the
of a phthisical cavity. In very rare cases the lung gives way in the
stages of phthisis, or in connection with emphysema, abscess, ga
hydatids, or cancer; or the vesicles rupture from violent cough, es
hooping-cough; or a collection of air or blood under the pleur
rates the latter. 2. Perforation may take place from the pleura i
lung, in connection with empyæma or abscess of the chest-wal
Injury may lead to pneumothorax, viz., direct perforation from w
fractured ribs, or severe contusion. 4. The stomach or œsopha
been known to rupture into the pleura. It is unnecessary t
sider those cases in which gas is present from the decomposi
fluid.

ANATOMICAL CHARACTERS.—The gas generally consists of
carbonic anhydride, and nitrogen in variable proportions, with
some circumstances fœtid ingredients, such as sulphuretted hy
It may fill the pleural sac completely, compressing the lung; or is
times limited by adhesions. It tends to excite inflammation, the re
effusion being either serous or purulent.

SYMPTOMS.—It is only necessary to consider those which are
tive of perforative pneumothorax. Usually a sudden, very inten
in the side is experienced; as well as occasionally a sensation of
thing giving way, and of fluid pouring out; followed by urgent dy
and signs of shock. These symptoms frequently immediately f
violent cough. The dyspnœa may temporarily diminish, or s
increases in proportion to the amount of air accumulated, unt
stant or paroxysmal orthopnœa is established. The voice b
feeble, in some cases to complete aphonia. Cough is often re
difficult and ineffectual, and expectoration ceases. Occasionall
is much hyperæsthesia of the side. The pulse is frequent, wea
small, but breathing being hurried out of proportion, the puls
ration ratio is altered. The patient generally presents an anxi
distressed aspect, and soon evidences of apnœa are appare

mmon mode of decumbency at first is dorsal, with the head raised d the body inclined to the sound side ; or the patient may assume a eeling posture, supported on the elbows. In many cases the posture changed frequently, and when fluid collects there is a tendency to lie the affected side.

It must be borne in mind that even in severe cases the symptoms y be by no means marked ; and when the escape of air is limited by hesions, they are usually comparatively slight.

PHYSICAL SIGNS.—The amount of air accumulated ; the presence and antity of fluid mixed with it ; and the patency or closure, as well as e size, of the perforation into the lung, will modify the physical signs pneumothorax. 1. The side is enlarged, often to an extreme degree, e spaces being widened and effaced or even bulged out, so that the face of the chest feels smooth. 2. Movements are deficient or an- lled. 3. Vocal fremitus is weak or absent. 4. Percussion reveals at st increased resonance, the sound being often typically tympanitic, d this may be noticed considerably across the middle line. Some- es it has an amphoric quality. If the amount of air is extreme, there dulness with much resistance. When effusion of fluid takes place, ness will be observed in dependent parts, moveable with change of ture usually. Occasionally at the line of junction of fluid and air an phoric note can be elicited, with a quivering sensation to the fingers. Respiration sounds may be weak and distant, or almost suppressed ; ically amphoric when the fistula is open, with a metallic echo ; or ernately one or the other. A whistling inspiration is heard in rare tances, due to the passage of air through a narrow chink. 6. Vocal onance may be feeble or absent ; or exaggerated, with a metallic or phoric echo ; while the whisper in some cases is very loud, and has marked metallic character. 7. Cough may also have a metallic echo. Metallic tinkling is sometimes distinctly produced by breathing, ghing, or speaking ; and the bell-sound may be elicited. 9. Succus- gives rise to a splashing sensation and sound, if both air and fluid e present. 10. The mediastinum, heart, diaphragm, and abdominal gans are displaced to a variable degree. 11. The heart sounds are w and then intensified on the affected side, and attended with a tallic echo.

PROGNOSIS.—Though a very grave event, pneumothorax is not neces- ily fatal, recovery occasionally taking place. It is less dangerous if alised. In some instances where it has occurred during phthisis, it ems to have delayed the progress of the lung-disease.

TREATMENT.—I have found great relief in some cases from strapping side firmly, as described under pleurisy. If the amount of air is siderable, causing urgent dyspnœa, paracentesis must be performed, pressure may be afterwards applied. Dry cupping of the chest is etimes useful. Stimulants and antispasmodics should be given to nteract shock and dyspnœa. Dr. Walshe recommends repeated in- tions of small quantities of chloroform. Pleurisy must be treated uld it arise.

CHAPTER XVII.

GENERAL DIAGNOSIS OF AFFECTIONS OF THE AND PLEURÆ.

IN this chapter it is intended to bring together the chief pul diseases which resemble each other, and point out their diagnostic In many cases they can only be severally distinguished by a f sideration of the history of the patient; local and general sym and physical signs present.

1. ACUTE PULMONARY AFFECTIONS.—The characteristic fea the principal diseases belonging to this group are indicated in lowing table :—

DIAGNOSTIC TABLE OF ACUTE PULMONARY DISEASES.

	Bronchitis.	Croupous pneumonia.	Catarrhal pneumonia.	Pleurisy.
1. Mode of invasion.	Coryza, and other symptoms of "cold." Not marked rigors, but only slight and repeated chills, if any.	A single, severe, prolonged rigor.	Generally after bronchitis or collapse, and without distinct rigors.	Several moderate rigors or slight chills, if any; may be very insidious.
2. Sensations about the chest.	Soreness, heat, or rawness behind the sternum. Muscular pains from cough.	Pain in the side frequently, not stitch-like, but more dull and diffused.	Pains about the chest often, but not specially localized.	Severe stitch-like pain in side.
3. Cough.	In paroxysms, often severe.	Considerable, and in paroxysms.	Short, hacking, and painful.	Slight, and patien tries to repress it.
4. Expectoration.	Abundant; changes its characters as the case progresses, from mucous to muco-purulent, &c.	Considerable; viscid, tenacious, and "rusty."	Often less than before; not "rusty."	Absent or ver slight, and of n special characters.
5. Disturbance of breathing.	Sense of dyspnœa in proportion to the extent of the disease; may be extreme. Pulse-respiration ratio not proportionately altered.	Very rapid breathing, and much perversion of pulse-respiration ratio, but not proportionate feeling of dyspnœa.	Rapidity of breathing increased when the complaint follows bronchitis; but feeling of dyspnœa may be less.	Quick shallo breathing at first but less disturb ance of pulse-res piration ratio tha in pneumonia Later on more o less actual dysp nœa.

Diagnostic Table of Acute Pulmonary Diseases—*continued.*

Bronchitis.	Croupous pneumonia.	Catarrhal pneumonia.	Pleurisy.	Acute phthisis.
Often absent or slight, and temperature rarely above 100° to 102°. Skin moist.	Considerable; temperature usually high, 103°, 104°, 105° or more, and runs a regular course. Skin acridly hot and dry.	Temperature high, but there are considerable remissions, and at irregular intervals.	Not great, and no regularity in course of temperature. Skin not acridly hot.	Often very high, especially in the tubercular form, but no regularity in temperature.
Tendency to cyanosis if the disease is extensive. In some cases adynamic symptoms.	Marked flushing of face, often unilateral. Not cyanotic. Usually great prostration.	Face is flushed. Often much anxiety and restlessness, with loss of flesh and strength.	Nothing special. No particular prostration or tendency to cyanosis.	Severe prostration and weakness, with profuse perspiration and rapid wasting. In the tubercular form extreme adynamia.
Various dry and moist râles, and rhonchal fremitus. Signs of obstruction of bronchial tubes. More or less bilateral.	At first crepitant rhonchus; followed by signs of consolidation, viz., diminished movement, increased vocal fremitus, dulness, bronchial or tubular breathing, increased and metallic vocal resonance; finally signs of resolution. Usually one base is affected. The side is not notably enlarged, nor is there displacement of organs.	There may be signs of consolidation in scattered spots, with râles. Both lungs are usually involved in irregularly scattered patches. When the disease follows extensive collapse, there may be a peculiar pyramidal form of dulness.	At first friction-sound or fremitus; succeeded by signs of fluid, viz., side often enlarged, movements interfered with, diminished vocal fremitus, dulness, occasionally moveable, weak or suppressed breathing and vocal resonance, œgophony sometimes, displacement of organs; finally, signs of absorption, with redux friction sound or fremitus. Usually on one side.	At first merely signs of bronchitis, followed by consolidation, softening, or excavations in different parts, especially the bases. In the tubercular form there is frequently nothing but scattered râles.
Variable. No crisis. Tendency to death by apnœa or adynamia in capillary bronchitis.	Often a marked crisis, and ends within a certain period.	No crisis, and course often prolonged.	No crisis, and course very variable.	Generally very rapid course, and fatal termination.

The diagnosis of pulmonary congestion and its cons and gangrene, have been sufficiently indicated in t these morbid conditions. It is often difficult to diagn lobular collapse and lobular pneumonia, but the therm important aid in distinguishing them.

2. Occasionally a case comes under observation enlarged, and there is a doubt as to whether the physic fluid or to very extensive solid accumulation, especiall of the lung. Under such circumstances the di founded on—*a.* The history of the case. *b.* Certain p in consolidation the chest is uneven on its surface ; ther but a marked sense of resistance on percussion ; as a bronchial breathing, with increased vocal resonance the heart-sounds, though there may be complete absen and voice, except perhaps in certain spots, such as cl *c.* The symptoms present, and general condition. there are frequently pressure-symptoms ; more sever pectoration ; and the sputa may have special chara being also not uncommon. If there is any actual un must be had to the employment of the aspirateur or a suction-trochar, by means of which some fluid, if p moved for examination, and no damage is done if the

3. There are certain conditions in which signs within the chest is observed, viz., emphysema ; hy lung ; and pneumothorax. There may be some diffic the two former, and they are often more or less as trophy is generally unilateral, following some affectio interferes with the action of the opposite lung ; while are simply exaggerated ; and there are no symptoms. usually bilateral : expiration and its sound are much pr are often heard ; and there is characteristic dyspnœa conditions of onset ; severity and nature of the symp variably unilateral character ; great enlargement of

family history of the case in all its details, and not least its dura- b. The local symptoms, especially the presence and character of and the nature of the sputa, which should be carefully examined, ccurrence of hæmoptysis, and the characters of any blood expecto- , being points of much importance. c. The constitutional and al condition, as indicating tuberculosis or cancer, emaciation, ity, or pyrexia. d. The presence of signs of tubercle or cancer in parts. e. The physical signs noted, including their characters; seat, as to the part of the lung affected, and whether one or both; heir extent. Chronic pneumonia, cancer, and phthisis are often led with signs of cavities, these being in the last affection usually marked at the apex, but not so in the others. In cancer dulness ntly extends across the middle line. It is important to make gh examination for the presence of a tumour in the chest, which by causing pressure on a bronchus, lead to collapse; and also k for other signs of pressure, which are generally associated with r. f. The progress and duration of the case, which will usually onsiderably when there is any obscurity.

Sometimes there is a difficulty in distinguishing between chronic hitis and phthisis, when the former is attended with profuse puru- xpectoration and wasting. The slow progress and comparatively degree of emaciation; absence of fever; non-occurrence of ptysis; and absence of physical signs of consolidation followed by s, will serve to characterise mere bronchitis in the majority of but it must be borne in mind that it may end in phthisis. For agnosis of the different forms of phthisis from each other, which n difficult, reference must be made to what has been said in allud- its varieties.

It may be necessary to determine the nature of any fluid in the and the cause of its presence, and here it must be mentioned uid may find its way from the abdomen, as from an abscess of the r kidney bursting through the diaphragm. There will then have previous symptoms indicative of these conditions. With regard to termination of the nature of the fluid in cases of pleuritic effu- fter inflammation, it is impossible to come to any positive con- n without making use of the aspirateur or exploring trochar, and ing some of it for examination. Mere hydrothorax is distin- ed from inflammatory effusion by the following characters :— is usually a part of general dropsy. b. Fluid is found on both but not in excessive quantity; accumulates in the lower part of euræ, pushing down the diaphragm, but not displacing the medi- m and heart as a rule; and is freely moveable. c. There are no n phenomena. d. Pain and tenderness are absent, but dyspnœa erally very severe. e. There is no pyrexia. Hæmothorax is cha- ised by the circumstances under which it occurs; and signs of loss od. If there is any uncertainty the aspirateur should be employed.

It must be mentioned that symptoms and physical signs may be ed in connection with the lungs due to certain morbid conditions iginally associated with these organs, such as rupture of hydatids liver or hepatic abscess into the lung, hernia of the stomach h the diaphragm, and other exceptional lesions.

CHAPTER XVIII.

DISEASES OF THE CIRCULATORY ORGANS.

I. CLINICAL PHENOMENA CONNECTED WITH THE HEART.

The evidences of disease in connection with the central organ for the circulation of the blood are necessarily not confined to this part alone, but must be more or less apparent throughout the entire system. It is essential to notice, however, at the outset, that most grave organic cardiac mischief may be present without there being any evident symptoms to indicate this; and, on the other hand, apparently serious disturbance of the heart may be observed, which is entirely functional. Further, other diseases are often associated with cardiac affections, especially renal and pulmonary, which may greatly modify the symptoms.

1. Various subjective sensations are often experienced about the cardiac region, viz., pain, oppression, dragging, sinking, or unpleasant sensations associated with the movements of the heart, such as palpitation, irregularity, jogging, rolling, falling back, jumping into the throat, intermittency, or complete stoppage. These are sometimes attended with extreme distress and dread of death. There may be tenderness; or, on the other hand, relief from pressure.

2. The action of the heart is frequently disturbed, being feeble almost to cessation, excited, palpitating, irregular, or intermittent.

3. Symptoms may result from excessive action of the heart, especially about the head and face, such as dull heavy headache, with sense of fulness and rushing of blood; throbbing sensations; giddiness; noises in the ears; flashes and specks before the eyes; flushing of the face; or heat of head. In short there are the signs of active congestion, which may even terminate in rupture of the vessels of the brain, or epistaxis. When the right ventricle is acting unduly, symptoms of active congestion of the lungs arise.

4. On the other hand, deficient cardiac action gives rise to special symptoms, due to an insufficient supply of arterial blood, viz., those of actual syncope; or attacks of an apoplectic or epileptiform character; or merely a state of habitual want of vigour and incapacity for any exertion, with coldness and clamminess, especially of the extremities, pallor, and a tendency to faintness.

5. A most important series of phenomena in cardiac diseases result from mechanical interference with the circulation of the blood, in consequence of which the pulmonary or general venous system or both become overloaded, this being also associated commonly with imperfect oxygenation of the blood and deficient supply to the arteries, the latter causing a more or less marked anæmic appearance. When the pulmonary circulation is involved, bronchial catarrh, pulmonary congestion, œdema, or even hæmorrhage may result, attended with the usual symptoms. Long-continued congestion will lead to thickening or atheromatous or calcareous degeneration of the pulmonary vessels; proliferation of cellular tissue in the lungs, with excessive formation of pigment; or emphysema. It is necessary to allude to the characters of ordinary *cardiac dyspnœa* or *cardiac asthma*. It resembles that of exertion, being more or less hurried, panting or gasping, and noisy. It is subject to much variation, being liable to come on in very severe paroxysms, breathing being quite free and undisturbed in the intervals, the fits occurring particularly after any effort, especially ascending heights, or when the patient lies down or falls asleep. The act of respiration is not interfered with, hence it is not very frequent, nor is expiration prolonged as in emphysema, and the respiratory movements and sounds are quite free. Of course if the lungs are involved the characters of the breathing will be modified accordingly, and true bronchial asthma may be observed. A peculiar disturbance of respiration has been described by Cheyne in fatty disease, in which the act becomes gradually hurried and deeper up to a certain point, and then subsides by degrees until at last there is a momentary cessation of breathing and dead silence. Involuntary sighing is occasionally observed.

When the general venous system is obstructed, the various tissues and organs of the body become mechanically congested, and the consequences of this stagnation follow, viz., serous effusion; permanent enlargement of capillaries; increase of connective

thickening and contraction ; or rupture of vessels, with hæmorrhage. It
y to consider in some detail the symptoms resulting from these morbid con-
. As the result of the general venous plethora, the patient presents a more
notic appearance, especially about the lips, fingers, and toes ; with pallor,
ent supply of arterial blood. In time the face becomes puffy and bloated.
ger ends clubbed. The patient feels chilly, and is deficient in vitality and
ing disinclined for any exertion, languid, apathetic, and easily fatigued.
later dropsy sets in, usually beginning in the feet and ankles and extending
nding in general anasarca with serous effusions. As a rule it is gradual in
and often subsides temporarily under appropriate treatment ; in some in-
wever, it is rather rapid in its appearance, and then relief may follow as
est symptoms. If general cardiac dropsy comes on rapidly, it is usually
y got rid of and less likely to return soon, than when it is gradual in its pro-
connection with the venous congestion and dropsy cutaneous lesions are
e set up in the legs, viz., erythema, erysipelas, eczema, rupture of the skin,
or chronic ulceration. *b.* Some very striking symptoms are due to the
e of the circulation in the central nervous system. These are dull, heavy
sensations of giddiness and unsteadiness ; sleepiness, sleep, however, being
y startings and most unpleasant dreams ; mental obscuration, with irrita-
t of resolution and stability, indisposition to mental effort, and impairment
llectual powers generally ; disturbances of vision and hearing, there being
ne objective changes in connection with the eyes ; curious sensations or
in the extremities. Ultimately gradual sopor ending in complete coma may
apoplexy or ventricular effusion may occur. *c.* The digestive and assimi-
ns also readily suffer in most cases. The tongue becomes full, large, con-
l marked with the teeth ; the mouth and throat being also often the seat of
gestion. The stomach becomes the seat of catarrh with increased secretion
leading to dyspepsia, sensation of fulness in the epigastrium, flatulence,
, and deficient or depraved appetite. From intestinal congestion results
n, diarrhœa, or an alternation of these symptoms ; and in course of time
ds are originated. The liver is at first congested and enlarged, and a certain
jaundice is often evident, this being partly due to congestion of the mucous
lining the bile-ducts. The bile also is liable to be unhealthy, owing to an
of mucus from the gall-bladder, and this increases the difficulty of digestion.
the liver may become the seat of a form of cirrhosis. After a time the
ds to become permanently enlarged. *d.* Undoubtedly the kidneys may
d, becoming congested and probably finally cirrhotic ; hence at first the
icient in quantity, dark, concentrated, and of high specific gravity, deposits
contains more or less albumen, as well as casts in some cases. There may
d tenderness over the renal region. Catarrh of the bladder occasionally
. From congestion of the genital organs symptoms commonly arise in
., menorrhagia, metorrhagia, leucorrhœa, and possibly metritis. In males
liminution in sexual power and inclination ; while prostatic enlargement and
ave been supposed to be occasionally due to cardiac affections.

dangerous symptoms may arise in connection with heart disease, from the
of clots and other matters in its cavities, portions of which are also liable
reyed into the circulation as emboli, inducing local symptoms associated
cted arteries, or giving rise to general contamination of blood.

xceptional instances certain conditions of the heart or pericardium may
mptoms by causing pressure on neighbouring structures.

ac affections will necessarily influence materially the state of the pulse, from
t important information may be gained. In all cases, therefore, the pulse
thoroughly investigated in all the particulars to be presently described ;
quisite also to examine carefully in order to determine whether the arteries
dition of degeneration or not.

e instances dangerous symptoms result from rupture of the heart, and con-
ape of blood.

II. CLINICAL PHENOMENA CONNECTED WITH ARTERIES.

ionally there may be pain, throbbing, tension, or other sensations associated
h some diseased condition of an artery ; and tenderness is not uncommon.
re on neighbouring structures gives rise to an important class of symptoms

in connection with aneurismal dilatation of arteries. Only aneurisms in t
abdomen, however, come specially under the notice of the physician. At
symptoms due to pressure within the chest will alone be considered. They
from the pressure of any mediastinal tumour, and therefore the description
will apply to all forms of mediastinal enlargement, it being borne in m
exact symptoms present must necessarily depend upon the situation, shape,
tion and rate of growth, and other characters of the tumour; that it is
whole of those mentioned to be observed in the same case; and that they
change, owing to an alteration in the direction of growth or other causes.
in which pressure contributes to the production of symptoms may be
generally as follows:—*a.* By causing displacement, as of the heart, trach
vessels; and altering the relation of orifices. *b.* By pressing upon holl
organs, and obstructing them to a greater or less degree, *e.g.*, the air
phagus, great vessels, thoracic duct, heart. *c.* By compressing the
organs, and thus preventing them from performing their functions, *e.g.*
d. By leading to actual destruction of tissues, as of the chest-walls, spinal
of hollow tubes, pericardium or heart, lungs, nerves. *e.* By irritating
nerves, symptoms being often thus set up at a distance from the seat
f. By exciting local inflammation, ending in exudation, adhesions, or supp

Such being the general effects of pressure, the special symptoms may b
according as the pressure tends in an outward or *centrifugal*, or an inwa
petal direction.

(i.) *Centrifugal symptoms.*—In addition to obvious physical signs, pre
parietes of the thorax will excite pain, either neuralgic; or due to infl
various structures; or to destruction of bone, when it tends to be heav
and gnawing. When neuralgic the pain often shoots in various direct
along the neck or down the arm. There may be merely a sense of weight
sion, or heat, or indefinable feelings. Tenderness is frequently observed an
extreme hyperæsthesia. Actual paralysis of nerves may ultimately be ca
vertebral column is eaten through, symptoms associated with the spinal
up, first indicative of irritation, and subsequently of destruction.

(ii.) *Centripetal symptoms.*—*a.* Pressure on the right side of the heart or
artery will interfere with the supply of blood to the lungs, and thus aid
dyspnœa, while it leads to general overloading of the venous system. T
the heart is very liable to be disturbed when it is pressed upon. *b.* Obstru
main arteries—innominate, carotid, or subclavian—will alter the character
responding carotid or radial pulse, diminishing its fulness and force, or
c. Most important symptoms result from pressure on the large systemic v
the superior vena cava, either innominate, or the vena azygos major. V
the inferior cava interfered with. Venous congestion, œdema, enlargeme
laries and veins, the formation of coagula, or actual rupture follows, the
extent of the symptoms necessarily depending upon the vein which is
being usually confined to the head, face, neck, chest, and arms, and
lateral or unilateral. The face, especially the lips, is often puffed an
senting distended capillaries. The neck may be full, thickened, and tun
having a peculiar spongy or elastic feel, somewhat resembling that of ere
The throat is often congested and forms much secretion. More or less sev
symptoms result from the venous congestion of the brain, and deafness i
complained of. If the vena azygos is pressed upon, there are signs of sp
tion, viz., sensory and motor disturbances in the lower part of the body.
inferior cava be interfered with, there will be anasarca of the legs and
walls, accompanied with ascites and other signs of obstruction in the
circulation. *d.* Rarely the pulmonary veins are compressed, causing pul
gestion and its consequences. *e.* The various morbid conditions set up in
with the main air tubes or lungs will cause more or less severe dysp
hæmoptysis, alterations in voice, and other symptoms. Frequently mark
symptoms are present, either due to direct pressure; chronic laryngitis and
which may be the result of mere irritation of the nerves; or functional nerv
ance. When hæmoptysis occurs, the blood sometimes resembles "curran
From œsophageal obstruction dysphagia may result; and if food canno
emaciation necessarily follows. Rarely hæmatemesis takes place. *g.* Extr
tion is said to be the consequence of obstruction of the thoracic duct. *h.*
nerves originates numerous phenomena, some of which have been alre

ference with the vagus nerves or pulmonary plexuses disturbs breathing and ic action. The recurrent nerves, especially the left, are peculiarly liable to be upon, severe laryngeal symptoms and dysphagia being thus produced. Pres- the phrenic nerve will affect the action of the diaphragm. Diminution in the the pupil of the eye, or, more rarely, dilatation, depends upon more or less nce of the sympathetic; this also may affect the temperature and nutrition of of the head and face. Some of the nerves forming the brachial plexus are in al instances so pressed upon as to lead to paralysis of the arm; and pressure intercostal nerves may cause paralysis of the corresponding muscles.

y be allowed to digress here to draw attention to the absolute necessity of an knowledge with regard to the medical anatomy of the thoracic contents, as s of the functions of the various structures, before the symptoms due to pressure at all comprehended.

Obstruction of an artery will be followed by symptoms dependent upon the want oper supply of arterial blood in the part to which the obstructed vessel normally s it. These will vary not only with the organ or part which is thus deprived, according to the degree and rapidity of obstruction. If sudden and com- , it will lead to immediate cessation of functions, and thus may induce serious s, as in the case of the brain, in connection with which sudden loss of ness and hemiplegia may follow obstruction of an artery; or when the main of a limb is blocked up, which is followed by local paralysis. If more gradual anæmia, diminution of temperature, depression of functions, and deficient , which may end in softening or actual gangrene The pulse also is more weakened to complete extinction in the arteries which receive their blood from ich is obstructed; while in the portion of this nearer the heart there is increased ion.

iseased conditions of arteries may originate emboli or substances which con- the blood, thus giving rise to symptoms of obstruction in other parts, or to symptoms indicating septicæmia.

erious phenomena, both local and general, will necessarily attend the rupture rtery, if it is of any size.

he Pulse.—To feel the pulse has always been justly looked upon as one of the ties of a medical practitioner. This gives invaluable information in general s and various affections connected with other organs which influence the heart sels; as well as with regard to their own special morbid conditions. The will be considered under *physical examination.*

III. CLINICAL PHENOMENA CONNECTED WITH THE VEINS.

here may be pain, tenderness, or cutaneous redness in the course of veins. n veins are obstructed in any way, local formation of clots being the most cause, there will be the signs already described, varying in extent and situa- ording to the vein involved. 3. Emboli may originate from clots in veins, conveyed to various parts of the body.

V. PHYSICAL EXAMINATION OF THE CIRCULATORY ORGANS.

chief modes of physical examination applicable for the investi- of the circulatory system are similar to those already described nection with the lungs. In addition, two special instruments are red. viz., the *sphygmograph* and *cardiograph.* The latter has y been used as yet to an extent sufficient to make it available for y practice; the former is an important instrument, and will call e detailed consideration.

nature of the information afforded by the different modes of ation in connection with the heart and vessels may be thus sum- I. *Inspection* reveals:—1. Any alteration in the shape and size chest over the cardiac region; or any bulging corresponding to rism. 2. Certain points about the impulse of the heart. 3. ount of visible pulsation in the great arteries of the neck; the

existence of abnormal pulsation; and certain conditions of the
of the limbs. 4. The state of the superficial veins, as well as
large veins in the neck, especially the right external jugular. *Pa*
indicates:—1. Any local change in size and shape. 2. The
characters of the cardiac impulse. 3. The presence of any
thrill or pericardial friction-fremitus. 4. The condition of th
arteries of the neck; the characters of any abnormal pulsation,
visible or not; and the state of the arteries of the limbs. 5.
points about the veins of the neck. *Mensuration* merely giv
accurate information with regard to form and size. *Percussion* di
—1. Any alteration affecting the cardiac dulness; and the am
resistance felt over this region. 2. Abnormal dulness due to a
rism. *Auscultation* is mainly useful for investigating certain
viz.:—1. Sounds connected with the heart. (i.) The ordinary
sounds. (ii.) Abnormal sounds originating within the heart,
endocardial murmurs, usually depending upon some morbid c
in connection with the orifices and valves. (iii.) *Pericardial mur*
friction-sounds, due to roughness of the surfaces of the peri
2. *Arterial sounds* and *murmurs*, especially in the large arterie
chest and neck, but which may be observed in the smaller
3. *Venous murmurs.* It may be mentioned that the stethoscop
very serviceable for realising certain characters of the cardiac im
of an aneurismal pulsation, through the sensations thus convey
head.

I proceed now to consider the physical examination of the
parts of the circulatory system.

A. EXAMINATION OF THE HEART.

I. CHANGES IN THE FORM AND SIZE OF THE CARDIAC RE

1. *Bulging.* This may extend from the second to the sev
and the sternum may be partly involved. The intercostal sp
either normal or prominent. Measurement shows that there is
distance from the nipple to mid-sternum on the left than on
side. Bulging is most liable to occur in young persons. *Cau*
Enlargement of the heart, especially hypertrophy. (ii.) Pe
effusion.

2. *Depression.* There may be a general falling in over the
region; or the spaces are chiefly affected. *Cause.* Pericardia
nation, with adhesion to the chest-wall.

II. CARDIAC IMPULSE.

The cardiac impulse is investigated by inspection, palpation
some cases by applying the stethoscope. In health it is usual
fifth left interspace, about 1½ inch below and ¾ inch inside th
over an area of about an inch. It is single and systolic in time
heaving and gliding down towards the left; gradual and not a
its development.

IMPULSE IN DISEASE.—When examining the cardiac imp
chief points to be noticed are:—1. Its exact position, and

es with different beats of the heart. 2. Its area as seen and
d if it is well defined or not. 3. Its force. 4. The characters
its to the touch. 5. Its rhythm. 6. The effects of change of
upon it.

ition. The impulse may be displaced by conditions external
eart; morbid changes in the pericardium; alterations in the
e heart itself; or a combination of these. (i.) *Elevation.* The
is often raised to the fourth space or higher. *Causes. a.*
up of the heart by some abdominal accumulation, such as
r an enlarged liver. *b.* Upward traction, owing to diminution
lk of the lung from contraction of a cavity in the left apex, or
extent in the right, with the formation of adhesions. *c.* Peri-
ffusion and subsequent adhesion. *d.* Diminution in the size
art from atrophy or great loss of blood. (ii.) *Depression.* The
is often lowered, and may reach as low as the seventh or
b. *Causes. a.* Cardiac enlargements, especially hypertrophy,
neral or affecting the left side. *b.* An aneurism or other
bove the heart, pushing it down. *c.* Pericardial effusion in
es. *d.* Weakness of the great vessels, owing to some acute or
inued illness, allowing the heart to fall down. (iii.) *Lateral
ent*, either to the right or left, is very common, being often
d with elevation or lowering. *Causes. a.* Pushing aside of the
a collection of fluid or gas in either pleural cavity, especially
an enlarged lung, from emphysema, hypertrophy, or cancer;
urism or other tumour. *b.* Cardiac enlargements. According
ture of the enlargement and the part of the heart affected, the
vill be carried more to one side or the other. As a rule it may
at hypertrophy tends to displace it towards the left; dilatation
the right. *c.* Pericardial effusion, which always carries the
to the left. (iv.) Occasionally the impulse alters its position
beat of the heart, when this organ is greatly dilated.

a and degree of definition. (i.) The area of the cardiac impulse
creased to a variable extent, being either well defined or the
Causes. a. Cardiac enlargements, especially if associated
ardial agglutination. *b.* Excited action of the heart. *c.* Un-
ct of the heart with the chest-walls, either from retraction of
ing: adhesion between the pericardium and costal pleura;
osteriorly by an enlarged liver or spleen or a tumour; or
of the chest-walls. *d.* Pericardial effusion, in which the
ppears to be very extensive and ill-defined. (ii.) *Diminished*
served in most of the conditions which weaken the impulse,
ot of much practical importance.

This may be—(i.) *Increased. Causes. a.* Hypertrophy of
b. Too close contact with the chest-walls. *c.* Excited
i.) *Diminished*, sometimes to complete extinction. *Causes.*
nal weak action of the heart from any cause. (*b.*) Certain
eases, viz., dilatation, fatty degeneration or infiltration,
Fluid or air in the pericardial sac. *d.* Distension of the
ially the left, from emphysema or hypertrophy, which then
en the heart and the chest-walls.

acters. The impulse often presents unusual characters, the

following being the most important :—(i.) *Undulatory or*
This may be only visible, or felt as well. *Causes.* *a.* Per
effusion. *b.* Dilatation of the heart, with thin, weak, and deg
walls. *c.* Uncovering of the heart, with adhesions to the chest-
(ii.) *Heaving or pushing.* It is for the purpose of observing
character that the stethoscope is useful, through which the move
becomes often very obvious, both to the auscultator and to bystand
A distinctly heaving impulse is characteristic of cardiac hypertro
(iii.) In dilatation the impulse is often quick, sharp, and slapping.
When the heart is very feeble the action may be jerking or flu
(v.) If pericardial agglutination exists along with hypertrophy or dil
tion and valvular disease, the impulse frequently acquires very pec
characters, differing in different cases, and there may be even a rece
rather than an impulse.

5. *Rhythm.* (i.) *Irregularity* is often observed, both as regards
and time; or the beat may be *intermittent.* *Causes.* *a.* Func
disturbance of the heart's action. *b.* Cardiac diseases, viz., great dil
tion, fatty disease, and some cases of mitral or aortic regurgitation
enlargement of the left ventricle. *c.* Malformation of the heart.
Occasionally pericardial effusion or adhesions. (ii.) In perica
effusion the impulse sometimes seems *to lag behind the ventri*
systole, as if it took some time to be conveyed to the surface. (iii.)
systolic impulse may be *double* or *treble;* or a *diastolic* impulse
likewise be present. This is observed in some instances of dilat
and hypertrophy with adhesions.

6. *Effects of change of posture.* (i.) *Increased mobility* of the
beat has been considered a sign of pericardial effusion, but it is no
much importance. (ii.) The fact that it *does not alter in different*
tures is sometimes of much aid in determining the existence of
sions—pericardial and pleuritic.

It is necessary to allude briefly to the impulse not uncommonly
towards the base of the heart; and to that in the epigastrium.
impulse is observed in many cases where a cavity in the apex of the
lung has contracted, drawing up the heart and bringing it into close
tact with the chest-walls, adhesions probably forming; it may be
excessive hypertrophy about the base, or aneurism of the heart. Epi
tric impulse is generally cardiac; sometimes it is the result of aortic
tion; or, it is believed, of regurgitation into the inferior vena cava.
cardiac epigastric impulse is either due to displacement of the hea
enlargement of the right ventricle; or it may be the natural consequ
of a short thorax.

III. Peculiar Sensations felt over the Cardiac Region

1. *Thrill or purring tremor.* These terms sufficiently indicate
character of a peculiar vibratory sensation conveyed to the fingers,
is indicative of certain conditions of the orifices and valves of the
In order to determine the origin of a thrill, it is necessary to obse
situation and synchronism. It may be requisite to excite the hear
brisk movement before it can be felt. The different thrills which
be met with are as follows :—(i.) At the left apex—*a.* Systolic,

mitral regurgitation, especially if accompanied with hypertrophy. systolic, associated with mitral obstruction. (ii.) Systolic in the d right interspace near the sternum, due to aortic obstruction. Diastolic, felt down the sternum, occasionally observed in connec- with aortic regurgitation. (iv.) Very rarely systolic in inner part of d left space or opposite the third cartilage, indicative of pulmonary ction. (v.) Præsystolic in fourth left space or opposite the fourth ge. This is a mere curiosity, but has been said to accompany pid obstruction.

Pericardial friction-fremitus is very exceptionally observed in peri- tis. Differing in its characters entirely from thrill, it gives the im- ion of being quite superficial and rubbing; is moveable and lar as regards its site and rhythm, though usually felt chiefly g the systole; and seldom lasts for any length of time. It may be ated by pleuritic fremitus caused by the action of the heart.

IV. CARDIAC PERCUSSION.

ARDIAC DULNESS.—This is described as being *superficial* and *deep*. former corresponds to the part of the heart uncovered by lung, and gular in shape, bounded to the right by a line along the middle e sternum from the fourth cartilage, and to the left by a line ding obliquely from the same point to the apex. The deep cardiac ess extends as far as the limits of the heart, but it is exceedingly ult to mark it out, and this cannot be done without much ice.

ARDIAC DULNESS IN DISEASE.—The points requisite to be noticed —1. Position. 2. Extent and directions of increase. 3. Shape. Degree and quality. 5. Effects of change of posture.

1. *Position*. This may be entirely abnormal, as, for instance, when heart is displaced to the right by pleuritic effusion.

Extent and directions of increase. (i.) The area of cardiac dulness be *increased* more or less, this being usually associated with some ge in shape. *Causes*. *a*. Abnormal contact of the heart with the -walls, especially when due to retraction of the lung. *b*. Enlarge- ts of the heart, the extent and direction depending upon the part of heart involved and the nature of the enlargement. *c*. Accumula- of blood in the cavities or walls of the heart, especially as the result ome pulmonary obstruction. *d*. Liquid or solid collection within pericardium, but especially effusion from inflammation, the dulness increasing in an upward direction; and excess of fat. *e*. Increase ardiac dulness may be simulated by conditions external to the heart, consolidation of the margin of the lung; accumulation of fat; a d tumour; or aneurism of the aorta. (ii.) *Diminution* in cardiac ess is not reliable in determining the condition of the heart, but ost useful as indicating distension of the lungs, especially the left. es. *a*. Atrophy of the heart. *b*. Great loss of blood and conse- t emptiness of the cavities. *c*. Accumulation of air in the peri- ium. *d*. Hypertrophy or emphysema of the lungs.

Shape. The form of the cardiac dulness often affords important cations as to the cause of any increase in its extent. In pericardial

effusion it tends to be triangular, with the base down and
upwards. In hypertrophy it becomes elongated vertically; in
lateral enlargement takes place, especially towards the right
shape is square or circular. The form, however, will be
according to the part of the heart involved, and the degree in
two conditions are combined.

4. *Degree and quality*. The degree of dulness sometimes
distinction between pericardial effusion and cardiac enlar
being more marked in the former. If the pericardium or he
fied, the percussion note may become somewhat osteal in qu

5. With *change of posture* the dulness due to pericardial eff
be made to alter in extent and form.

Resistance.—The sensation conveyed to the fingers on
are not very reliable in the diagnosis of cardiac affections, bu
of resistance is likely to be more marked in pericardial effusi
hypertrophy.

V. AUSCULTATION OF THE HEART.

(A.) SOUNDS OF THE HEART.

It is essential to have a clear comprehension of the mode
of the heart and of the sounds associated therewith, before a
can be of any value in the investigation of its morbid conditi
regard to the sounds, it is requisite to know the characters
how these differ as examination is made over different parts of
and their modes of production.

During each action of the heart, on listening at the apex
be noticed in succession:—1. A systolic sound, synchronou
contraction of the ventricles. 2. A short silence. 3. A dias
at the moment when the ventricles cease to contract, and the
pulmonary valves close. 4. A longer silence, which is again
the systolic sound. As regards time, they bear about the foll
portion to each other, dividing an entire cardiac action into t

Syst. sound.	*1st interval.*	*Diast. sound.*	*2nd in*
$\frac{4}{10}$	$\frac{1}{10}$	$\frac{2}{10}$	

At the left apex, *i.e.*, just within and below the nipple, the sys
is prolonged and well defined; much accentuated; seems m
rather deep; and of rather low pitch. The diastolic is mu
sharper, and more abrupt; clearer; more superficial; a
pitched. At the right apex, *i.e.*, over the base of the ensiforn
both sounds are clearer and higher-pitched than at the lef
systolic is less accentuated, shorter, and sharper. Comparing
at the base and apex, it will be found that at the base the dias
becomes the more marked. It is loud and distinct; mu
tuated; clear and often ringing; while the systolic sound i
indefinite; shorter; and without any accent. At the righ
opposite the second space or third cartilage close to the st
sounds are usually louder than at the corresponding point
side, especially the diastolic. Finally it must be noticed that
are generally better heard under the left clavicle and over t

ly than over the corresponding regions on the right side. It is
rally recognised that the systolic sound is due chiefly to the
f the mitral and tricuspid valves and the muscular contraction
ntricles ; while the diastolic results from tension of the aortic
onary valves.

ultating the heart in order to detect abnormal conditions, it
cessary to make the patient stop breathing for a moment, and
advisable to excite the heart by a little brisk movement. In
ompare the sounds at the base and apex, some authorities
d the use of a double stethoscope, so that they may be heard
usly, but the ordinary instrument answers perfectly well.

SOUNDS IN DISEASE.—It is highly important to attend to the
ardiac sounds when investigating for morbid conditions, as
ntly afford most valuable information.

ATION OF THE SOUNDS AT THE LEFT APEX.—The stetho-
ld first be applied over the apex-beat, and the following are
ons from the normal which may be met with :—

ges in intensity and apparent depth. (i.) *The intensity may be*
Causes. (*a.*) Excited action of the heart from any cause.
ximation of the heart to the chest-walls, when the sounds
r to be superficial. (*c.*) Combined hypertrophy and dilatation,
y if the valves are somewhat hypertrophied at the same time.
ent quantity or a watery condition of the blood. (ii.) *Dimi-*
auses. (*a.*) Feeble action of the heart. (*b.*) Certain organic
fections, viz., atrophy; simple or concentric hypertrophy;
with thinning of the walls; changes in the muscular walls,
fatty disease, but also softening associated with fevers, and
cancerous infiltration. (*c.*) Collection of fluid, air, or much
ial in the pericardial sac. (*d.*) Distension of the left lung by
a or hypertrophy. In the last two conditions the sounds
e deep, in consequence of imperfectly conducting materials
between the heart and the parietes of the chest.

pitch, *quality*, and *degree of clearness* of the *systolic sound*
mportant information as to the condition of the valves and
e heart ; and also as to the quality of the blood. In marked
y without dilatation, the sound becomes toneless, dull, ob-
of very low pitch. In dilated hypertrophy with some thick-
he valves it may be clanging or musical. When the heart is
ted it is often high-pitched, abrupt, and clicking or slapping.
requently causes the systolic sound to become unusually
r, and high-pitched.

important to notice the *length of the systolic sound*; and to
relative lengths of the sounds and intervals. For instance, in
ertrophy the systolic sound is very prolonged ; there may be
diastolic sound ; and the intervals are shortened. In mere
the diastolic sound often becomes the longer one, so as to
e systolic, which is much shortened. The first sound is also
and abrupt in mitral obstructive disease.

ISON OF THE SOUNDS IN DIFFERENT PARTS OF THE CHEST.
n of advantage to compare the sounds over different parts of
but especially at the apex and base of the heart; and at the

blood through the mitral orifice, so that the pulmon
overloaded and the pulmonary artery distended.
either in connection with the heart itself or external
the position of this organ, will correspondingly modify
example, in left pleuritic effusion they are transferred
of the chest. 5. The extent and direction of conduc
may be useful in determining disease in other orga
solidation at the apex of the right lung they are very
the right clavicle than the left. In right basic pn
frequently very marked over the affected part. Cav
may intensify the sounds considerably, or sometim
unusual characters, such as hollowness or a metallic q

REDUPLICATION.—By this is meant a doubling of
is frequently observed, even in health, and does no
cardiac disease. Its cause is a want of synchronis
the two sides of the heart. It may be observed w
sounds; and at the apex or base. Without care a r
is liable to be mistaken for a murmur.

(B.) ENDOCARDIAL MURMURS.

An endocardial murmur is usually associated with
orifices, being either one of the ordinary sounds
racters; or altogether a new sound. In order to deter
cause of any murmur, it is necessary to observe :—
greatest intensity. 2. The directions in which it is
time, whether systolic, diastolic, præsystolic, or post-di
being the essential characters, it is always advisable,
to other particulars, especially the duration, loudness,
of a murmur; and its effect upon the ordinary sounds
accurate conclusion may be arrived at with regard t
tions of the valves and orifices upon which the mur
state of the heart's walls, and the manner in which th
and the quality of the blood.

GENERAL OUTLINE OF CAUSES OF MURMURS.—1.

current of blood, owing to displacement of the heart. (ii.) *Regurgitation* may be due to :—*a.* Mere enlargement of an orifice, the valves not widening in proportion. *b.* Organic changes in the valves, which prevent them from performing their functions properly, such as actual destruction or rupture, perforation, great contraction, thickening and rigidity, or adhesion to the walls of the heart. *c.* Organic changes in the appendages of the valves, viz., the chordæ tendineæ or musculi papillares, interfering with their closure. *d.* Mere irregular action or altered position of the musculi papillares, which prevents the valves from falling into their places at the proper time or in the proper manner. *e.* Degeneration at the root of one of the great arteries, interfering with the adaptation of its valves. 2. Mere roughness of the endocardium may cause a murmur, especially when due to endocarditis, and particularly if in the vicinity of an orifice. 3. Fibrinous coagula among the columnæ carneæ or upon the surface of the valves occasionally give rise to a murmur. 4. Cardiac murmurs may depend upon certain rare morbid conditions, viz., sacculated aneurism of the heart; abnormal communication between the cavities of the heart, or between either of these and one of the great vessels; or dilatation of the aorta at its commencement, the orifice being unaltered. 5. An abnormal condition of the blood may cause a murmur, *e.g.*, anæmia. 6. Excited cardiac action is liable to render the sounds rough and murmur-like. Murmurs have been appropriately divided into *organic* and *inorganic*, according as they are associated or not with positive organic mischief. The latter will be presently alluded to separately.

CHARACTERS OF MURMURS AT EACH ORIFICE.—Theoretically there may be two murmurs in connection with each of the four chief orifices of the heart, one indicating *obstruction*, the other *regurgitation*, but only *mitral* and *aortic* murmurs are usually met with, those associated with the *tricuspid* and *pulmonary* orifices being very exceptional.

I. MITRAL MURMURS.—These are loudest over or just above the apex-beat, being conducted more or less round the side in the direction of the left axilla, and to a variable extent upwards towards the base. 1. *Regurgitant.* Systolic in time, this murmur is generally of medium or low pitch, but varies much in its other characters; it may be so loud as to be heard extensively over the chest, but is not often distinct at the base of the heart, and in many cases becomes abruptly fainter on passing the stethoscope in this direction. It is commonly perceptible behind in the left vertebral groove, or even in the right, especially opposite the sixth to the ninth dorsal vertebræ. 2. *Obstructive or constrictive.* Usually this murmur is post-diastolic or præsystolic, being entirely a new sound, and having no connection with the diastolic sound. In some cases, however, it seems to begin almost simultaneously with this sound, and to continue through the entire interval. Its explanation is as follows :—As soon as the ventricle ceases to contract the mitral valves fall back and the orifice becomes patent. The blood which has collected in the auricle quietly passes through for a while, but finally the auricle, being distended, suddenly contracts, and drives on the blood with some force, this being immediately followed by the ventricular systole. It is at the time of this contraction that the murmur is usually perceived, and hence it is sometimes called "auriculo-systolic." If, however, there is great constriction with much thickening and roughness about the opening, it may be heard during the whole of the period that the blood is passing through. Hence the length of this murmur varies, but it is usually rather short. Its intensity is rarely very great, but even when loud the extent of its conduction towards the axilla is much less than that of regurgitant murmur, while it is only very exceptionally heard in the back. It seems, however, to be more conducted towards the right apex. The pitch is low, and quality almost always harsh, sometimes very much so, being almost grating. It is followed by a short and sharp systolic sound. Dr. Barclay has argued that this murmur really indicates regurgitation and not obstruction.

II. Aortic murmurs.—1. *Obstructive.* Most marked at the base of the heart, generally over the sternum and in the contiguous portion of the second right space, aortic obstructive murmur is conducted mainly upwards and to the right, but also to some extent down along the sternum and towards the left apex, though it is not often heard there. Behind it is audible in the left vertebral groove, usually from about the second or third to the sixth or seventh dorsal vertebra, but sometimes is heard all along the dorsal region and even on the right side. I have met with several instances in which the murmur was so loud as to be heard over the chest and back extensively, as well as for a considerable distance along the arteries. It is generally prolonged and of moderate pitch, occasionally musical. 2. *Regurgitant.* This murmur is usually loudest over the sternum, opposite the third space or fourth cartilage, being conducted chiefly downwards along the sternum, so that it is very distinct at its lower end, where it generally abruptly ceases. Towards the apex and the right infra-clavicular region it is not nearly so well conducted as the obstructive murmur, and it is very rarely heard in the back. Its rhythm is diastolic, it being in fact an altered second sound, but the murmur is always prolonged more or less into the interval, and may fill it completely. Indeed its duration is often so great as to lead to its being mistaken by the inexperienced for a systolic murmur, even when both exist together. Commonly it is of blowing quality, not harsh, and of medium or high pitch; but its characters are variable.

III. Tricuspid murmurs.—These are described as being heard at the right apex, *i.e.*, over the junction of the xiphoid cartilage and sternum, and to be conducted a little upwards and to either side. 1. *Regurgitant.* Regurgitation is common at the tricuspid orifice, but as this is due to mere enlargement of the opening, there being no roughness or thickening of the valves, and as the right ventricle does not act powerfully, a murmur is only rarely heard. When present, it is systolic, faint, and of low pitch. 2. *Obstructive.* This is a mere curiosity, but theoretically it would be præsystolic in time.

IV. Pulmonary artery murmurs.—These are audible at the left base, about the second space and third cartilage or space near the sternum, and are conducted upwards and to the left, so as to be heard under the left clavicle. As in the case of the aorta, two murmurs may be met with, viz., 1. *Obstructive or systolic.* 2. *Regurgitant or diastolic.* Of the former several instances have come under my notice; the latter is extremely rare.

Conditions influencing murmurs.—Without entering into particulars, it must suffice to state that murmurs may be modified as regards their intensity, seat, direction of conduction, and other characters by:—1. Deformities of the chest. 2. Posture. 3. Morbid conditions external to the heart, *e.g.*, emphysema, pleuritic effusion, lung-consolidation. 4. The state of the walls and cavities of the heart, as regards hypertrophy, dilatation, or degeneration. 5. The force and regularity of the cardiac action. 6. The presence of two murmurs at the same orifice. 7. The existence of two synchronous murmurs at different orifices.

INORGANIC MURMURS.—A brief summary may be given here of the inorganic cardiac murmurs which may be met with. 1. *Anæmic.* This has usually the characters of a faint pulmonary systolic murmur, somewhat blowing or whiffing in quality. It may, however, be aortic, and some have even localised it in the tricuspid or mitral orifice. Excited action of the heart; pressure with the stethoscope; and the erect posture intensify it. The chief theories of its causation are that it is due entirely to the abnormal state of the blood; to pressure upon the vessel by the stethoscope; or to unusual vibration of the walls of the artery or its valves, in consequence of their relaxed condition. Probably all these aid in its production. 2. Murmur resulting from irregular action of the musculi papillares in the left ventricle. Of the nature of a slight but inconstant mitral regurgitant murmur, this is usually associated with chorea, but may depend upon a very feeble or irregularly-acting heart. 3. Excited cardiac action or irregular palpitation, especially if associated with enlargement of the heart, may cause the first sound to become rough and murmur-like, particularly at the base. 4. Twisting of the heart may give rise to a basic systolic murmur. 5. External pressure generally leads to an aortic obstructive murmur, but occasionally it is pulmonary. 6. Murmurs due to clots in the heart are usually systolic, and connected with the right side.

(C.) PERICARDIAL MURMURS OR FRICTION-SOUNDS.

A friction-sound is often produced during the cardiac action by the rubbing together of roughened surfaces of the pericardium. The roughness may be due to excessive vascularization; exudation or its remains; coagulated blood; tubercle or cancer.

CHARACTERS.—In the following description of a *pericardial friction-sound*, the differences between it and an *endocardial murmur* will be evident. 1. Its seat and extent are very variable, depending upon those of the physical conditions necessary for its production, but frequently its point of greatest intensity does not correspond to that of any endocardial murmur; while it is usually abruptly limited even when loud, and is not conducted in the directions of endocardial sounds. 2. It appears distinctly superficial as a rule. 3. Great variety is observed as regards the intensity, quality, and pitch of a friction-sound. Usually it is more or less rubbing and rough in quality, but may be clicking, creaking, or grating, and Walshe describes churning and continuous rumbling varieties, due to the presence of fluid. It may differ over different parts of the heart. 4. The rhythm may be systolic, diastolic, or both, but very often it is irregular, not corresponding exactly to either, and *varying with each* beat of the heart. A double

murmur of maximum intensity at the same spot is considere
characteristic of pericardial origin. In many cases the heart-soun
be heard quite distinctly through the friction. 5. Pressure w
stethoscope frequently materially modifies a pericardial murn
increasing its area or intensity; altering its rhythm; raising its
or rendering it rougher in quality. 6. Bending the body forward
to intensify it, but this is not reliable. It may disappear in the
posture, and a change in position may affect the murmur, shou
be present in the pericardium. 7. A quick inspiration in som
intensifies the friction-sound and raises its pitch. 8. Rapid chan
liable to take place during the progress of the case, as regards t
extent, rhythm, and characters of a pericardial murmur.

It is necessary to mention that pericardial friction-sound i
simulated by pleuritic modified by the cardiac action. Its p
which is generally about the left border of the heart; marked
larity; and cessation when the breath is held, will usually s
distinguish the latter.

A *pericardial splashing sound* has been described, produced
cussion, and due to the presence of air and fluid, but it is ex
rare.

B. EXAMINATION OF THE ARTERIES.

In directing physical examination to the arterial system, it
first to attend to the great vessels of the chest and neck; and
the arteries of the limbs, especially the brachial and radial.

EXAMINATION OF THE ARTERIES OF THE CHEST AND NECK
chief abnormal conditions which may be observed here may
summarised :—

I. *Bulging*, which may be caused by aneurism.

II. *Changes in the amount and characters of pulsation as seen*
1. Excessive pulsation may be associated with :—*a.* Excited a
the heart. *b.* Hypertrophy of the left ventricle. *c.* Aortic re
tion, which is also characterised by an immediate subsidence
arteries. *d.* An atheromatous condition of the vessels. *e.* An
of various kinds, which present a limited excessive impulse,
expansile and heaving. 2. In cases of mitral regurgitation t
sometimes almost an entire absence of pulsation in the carot
subclavians, even when the heart is much hypertrophied.

III. *Thrill.* Arterial thrill may be associated with :—1. A
2. External pressure. 3. Diseased vessels and aneurisms, es
general dilatation with atheroma or calcification. A thrill may
in the suprasternal notch, owing to the aorta being thus affected.

IV. *Abnormal dulness and resistance.* The only morbid cond
an artery which can give rise to this deviation is an aneurism.

V. *Murmurs.* An arterial murmur is usually synchronous w
cardiac systole. Its causes are :—1. Pressure by the stethosco
ticularly over the third part of the subclavian, which may pr
murmur even in health, but especially in connection with hype
of the heart, aortic regurgitation, or anæmia. The anæmic mu
usually very easily induced; of high pitch, and blowing, whif
whizzing quality; and may be heard extensively. 2. Pressu

tumour, enlarged glands, or fibrous thickening and adhesions. One of the best illustrations is the subclavian murmur heard below the left clavicle in some cases of phthisis. 3. Roughness of the inner surface of an artery, from atheroma, calcification, erosion, exudation, or fibrinous coagula. 4. Change of form in an artery, viz., aneurism, in which the murmur may be systolic, diastolic, or both; and coarctation. 5. Abnormal communication between a large artery and vein, such as between the aorta and superior vena cava.

EXAMINATION OF THE ARTERIES OF THE LIMBS.—The brachial artery just above the bend of the elbow gives the best indications as to morbid states of the arterial system generally, especially atheroma and calcification. On bending the elbow the vessel is distinctly visible and tortuous, presenting a vermicular motion with each pulse; while it feels more or less hard and rigid, full, incompressible, and rolls like a cord under the finger.

THE PULSE.—Usually the radial artery at the wrist is made use of for observing the characters of the pulse, but it is often advantageous to look to other arteries, such as the brachial, temporal, or carotid, and when investigating local conditions special vessels must of course be attended to. The methods of examination are by inspection, palpation, and the use of the sphygmograph; and the points to be noticed include:—*a.* its visibility or invisibility; *b.* frequency; *c.* quickness (sharp, abrupt, slow); *d.* volume (large, full, small, thready); *e.* force and degree of resistance or tension (strong, weak, extinct; soft, hard; compressible, incompressible; equal or unequal); *f.* rhythm (regular, irregular, intermittent, lagging behind cardiac systole, continuous); *g.* special characters, both to sight and touch (rigid, tortuous, bounding, hammering, jerky, undulating, with sense of sudden subsidence, vibrating or thrilly, tremulous, dicrotic, or reduplicate). The term *dicrotic*, when applied to the pulse as felt by the finger, implies that this has a sensation of being doubled; now, however, it has a special significance, as indicating a peculiar character of the pulse brought out by the sphygmograph. *h.* Sphygmographic tracings. *i.* The effects of change of posture, and comparison of the characters of the pulse on opposite sides. These points are only required to be observed in exceptional cases.

THE SPHYGMOGRAPH.—For fuller information respecting this instrument reference must be made to the standard physiological works, and to the writings of Marey, Burdon-Sanderson, Anstie, Balthazar Foster, and others, on the subject. The sphygmograph must be seen in order to be properly understood, but it may be stated what it essentially consists of. An elastic steel spring, of sufficient strength, is provided on the under surface of one end with a convex piece of ivory, which is placed over the artery, the other end being fixed to the framework of the instrument. By a certain arrangement the movements produced in this spring by the artery are transmitted to a narrow lever moving on a pivot, and long enough to amplify them considerably. At the free extremity of this is a little pen, made of flexible metal, which traces the motions either on a piece of glazed paper by means of ink, or on smoked glass. This paper or glass is made to travel quickly and steadily in a certain direction, by the aid of an apparatus with clock-work which is wound up, and the plate can be started or stopped at will by a regulator.

As it passes along the pen traces upon its surface the movements
municated from the pulse through the spring.

A sphygmographic tracing is generally taken over the radial a
the apparatus being fixed on the front of the fore-arm, with the e
the spring over the artery near the wrist, being kept in its pla
elastic bands passing round the fore-arm, the back of which rests
pad. It is no easy task at first to fix the instrument so that the p
tions are rendered evident; and to regulate the pressure on the a
so that it shall not be too great or the reverse, and that thus the m
ments may be made visible in their maximum degree; this regul
is effected by means of a screw, and is a matter of much importanc

Description of a sphygmographic tracing. The entire tracing, of w
Diagram 1 is intended to give a general idea, is made up of a s

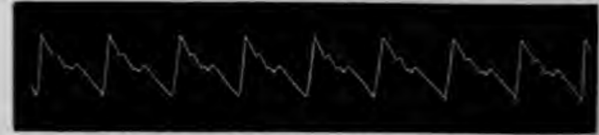

DIAGRAM 1.—SPHYGMOGRAPHIC TRACING.

of curves or pulsations, each of which corresponds to a complete
lution of the heart's action. It is necessary first to study the chara
of an individual typical curve. It may be described as consisting
systolic and *diastolic* part, corresponding respectively to the perio
contraction and dilatation of the ventricle; or may be divided int
a. line of ascent; b. summit; c. line of descent, in which are two or s
times three secondary waves, with intervening notches, named *fi*
distension wave; second or *great wave*, or *true dicrotism*; and *third*, w
lies between the other two, but is usually absent. In order to ex
these, it is necessary to point out certain facts in the physiology of
circulation, of which the sphygmograph has given far more acc
knowledge than was previously possessed; and to indicate the con
tion of each with the various parts of a pulse-curve. It will be w
take them in the order in which they occur, and their relation t
different parts is indicated in Diagram 2. The ventricle cont
more or less suddenly, opening the aortic valves, which give an imp
to the blood in the arteries; thus is produced the *line of ascent, sum*
wave, or *percussion impulse* (*a* to *b*). 2. After this sudden vibratio
arterial walls partially collapse, which is indicated by the first pa
the line of descent, ending in the *first notch* (*b* to *c*). 3. A wav
blood next passes out of the heart into the aorta, and this gives ri
the *first secondary wave*, *wave of distension* or *systolic pressure* (*c* t
4. After this there is a reflux of blood towards the heart, by whic
aortic valves are closed, which corresponds to the portion of the li
descent from *d* to *f*, ending in the *great* or *aortic notch* (*f*). 5. Du
this reflux a vibration may occur, producing the *third secondary wav*
which is placed as it were in the aortic notch, and which, as al
stated, is generally wanting. 6. The aortic valves are then sudd
closed by the pressure of the reflux-current of blood, and thus is
nated the *great secondary wave* or *true dicrotism* (*f* to *g*). 7. Fi

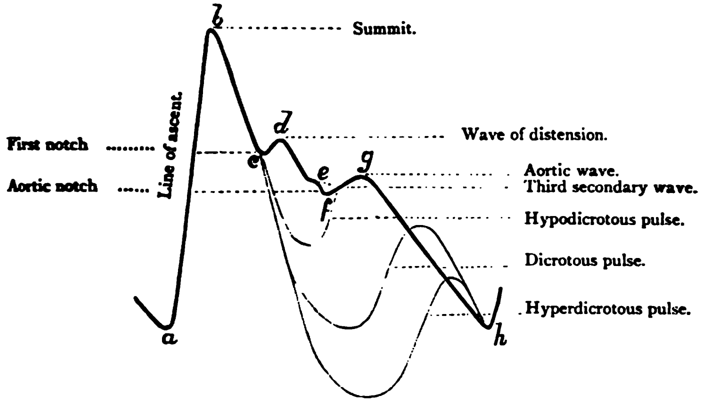

DIAGRAM 2.—ENLARGED SPHYGMOGRAPHIC CURVE.

the blood flows onward in the vessels, this corresponding to the remainder of the line of descent (*g* to *h*); after which the ventricle contracts again, and the same series of phenomena is repeated.

It will be seen on studying this description, that the systolic portion of the curve extends from the beginning of the line of ascent to the bottom of the aortic notch (*a* to *f*), during which the ventricle is either contracting or contracted; the rest of the line of descent corresponding to the diastole.

In observing a pulse-tracing, the following are the particulars to be noted:—1. The number of the pulsations on the tracing, which gives the exact frequency of the pulse. 2. With regard to each curve:—*a.* the length of the line of ascent, and whether it is vertical or more or less oblique; *b.* the shape of the summit, whether it is acute, rounded, or square; *c.* the presence, size, and position of the secondary waves; *d.* the direction and length of the part of the line of descent beyond the aortic wave, and if there are any undulations in it. 3. The relative characters of the curves in a tracing, especially their height and depth, observing whether their summits and bases are on the same level or not, which may be determined by drawing a horizontal line along the top and bottom of the tracing, these being respectively the lines of the greatest and least arterial tension. In this way the regularity or irregularity of the pulse is determined with precision.

The conditions which chiefly modify the sphygmographic tracing are:—1. The rapidity and force of the ventricular contraction. 2. The degree of arterial tension or resistance, which is influenced by the condition of the walls of the vessels; the controlling effect of the nerves upon them; and the degree of difficulty in the onward passage of the blood, either in the distal part of the artery itself, or through the capillary circulation. 3. The quantity of blood sent into the vessels, which is to some extent dependent upon the duration of the interval between the pulsations, as, if this is long, the blood flows onward, and thus the quantity in the arteries is diminished, and the pressure lessened. 4. The volume of the artery. 5. The condition of the aortic valves.

The more rapidly the ventricle contracts, the more vertical will be the line of ascent, while the height of this is in proportion to the force of contraction. If the ventricle is acting feebly the summit is more rounded. High arterial tension tends to diminish the height of the line of ascent, and render it more sloping; to make the first secondary wave proportionately more developed, and to raise it until it ultimately becomes blended with the apex, making this round or square; to do away with all minor waves; to lessen the aortic wave; and, if there is obstruction to the onward passage of the blood, to make the remainder of the line of descent slightly convex upwards, and to shorten it. Low tension produces the opposite effects, and is often attended with vibratory undulations in the line of descent, it being only when this condition exists that the third secondary wave is observed.

A healthy pulse-curve has a line of ascent nearly vertical and of moderate height; an acute summit; a gradual descent, presenting usually only the distension and aortic secondary waves. This form of pulsation is sometimes called *tricrotous*, because it has three waves. It must be remembered that physiological variations of the pulse-tracing will arise from taking food or alcohol, over-exertion, external heat, severe emotion, and other causes.

Certain terms are used in describing sphygmographic curves, which it is requisite to notice. When the first secondary wave is absent or nearly so; the aortic notch deep (owing to the closure of the valves being delayed), so that it is on a level with the base of the curve; and the aortic wave prominent, the pulse is called *dicrotous*. (See Diag. 2.) It indicates very low arterial tension. A less degree of this is named *hypo-* or *sub-dicrotous*. A greater degree, so that the aortic notch sinks below the level of the curve basis, the aortic wave forming part of the line of ascent of the next pulsation, is termed *hyper-dicrotous*. *Monocrotous* signifies that there is only the primary wave; and *polycrotous*, that there are a number of undulatory vibrations.

Uses of the Sphygmograph in disease. Undoubtedly the sphygmograph gives much more exact and accurate information with regard to the circulation than can be obtained by merely feeling the pulse, especially with respect to the action of the heart and the degree of arterial tension, while it reveals irregularities and inequalities which cannot otherwise be detected. It is employed for purposes of diagnosis and prognosis, and for indicating treatment. Its diagnostic value has, by different observers, been advocated in aortic disease, especially regurgitation; cardiac hypertrophy; senile degeneration of arteries; capillary disease associated with degenerative processes in tissues; and aneurisms; it being necessary in the last-mentioned to compare the pulses on the two sides. The characteristic features will be pointed out under the several diseases.

For prognostic and therapeutic indications the tracings obtained by the sphygmograph are very useful in fevers and other acute diseases, such as delirium tremens, pericarditis, pleurisy, or especially for comparing them with the temperature. Among the principal dangerous signs are a marked dicrotous, hyper-dicrotous, or monocrotous pulse; great inequality and irregularity; or a small curve; the ascent being short and not vertical, with a rounded or square summit.

C. Examination of the Veins.

eins from the examination of which most information may d are those of the neck and the superficial veins of the In many cases it is also useful to observe the superficial veins of ts, especially those of the abdomen and legs. In examining of the neck special attention should be paid to the right exgular, and to the venous sinus at the junction of the subclavian nal jugular. The following are the important abnormal signs ction with these vessels:—

largement. It is necessary to observe the degree of this; whes permanent or variable; and if the vessels are knotted or *Causes.* 1. Tricuspid regurgitation. 2. Obstruction of the vena cava, innominate, or some more local vein, owing to by a tumour or other morbid condition, or internal plugging mbus. 3. An aneurism communicating with a large vein in x.

cessive distension of the veins of the neck after a cough. During f coughing these veins always fill more or less, but when they ed and the valves are inefficient they become much more dishan usual, and the degree of imperfection in the valves may thus indicated.

ulsation and filling from below. Some believe that these chaan be seen even in healthy persons, but at any rate they are appreciable. In order to observe them the patient should assume bent posture, with the head low. Generally pulsation can only be t when very powerful it may also be felt. Care must be taken istake transmitted arterial pulsation for venous. In order to lling from below, it is requisite to press upon the right external ear the clavicle, and then draw the finger up the neck along its eeping up the pressure; it usually fills in jerks. *Causes.* 1. Triegurgitation alone may lead to pulsation, but usually this is soon d with—2. Inefficiency of the valves of the veins, which renders ation more marked, and which must exist before there can be g from below. 3. Right hypertrophy considerably intensifies ulsation.

enous thrill. A thrill is in very exceptional instances felt in on with the veins of the neck. It may accompany pulsation; e to extreme anæmia.

nous murmurs. 1. *Venous hum,* "*bruit du diable.*" This is the ous murmur which is at all likely to be met with, and it is very in connection with anæmia. Best heard at the junction of the ernal jugular and subclavian, especially on twisting the neck a the left, it may, however, be extensively diffused along the veins. tinuous and uninterrupted, though not uniform in its intensity; ble quality, such as humming or musical, blowing, buzzing, or whistling. Inspiration, pressure, and the erect posture inhe venous hum; while it is loudest during the ventricular cing in proportion to the force and rapidity of the current of 2. *Intermittent venous murmurs* have been described, associated ispid regurgitation, hypertrophy of the heart, and other morbid s, but they must be extremely exceptional.

CHAPTER XIX.

FUNCTIONAL DISORDERS OF THE HEART.

I. ANGINA PECTORIS—SUFFOCATIVE BREAST-PANG.

ETIOLOGY.—Angina pectoris is supposed to be a neurotic affection, associated with the cardiac plexus, and directly due, according to some to spasm, according to others to paralysis of the muscular walls of the heart. In the large majority of cases it supervenes upon some organic disease of the heart or pericardium, but not invariably; while it is not confined to any particular morbid condition, though most common in connection with extensive atheroma or calcification of the coronary arteries; fatty degeneration of the heart; and flabby dilatation. The *exciting cause* of an attack may be centric, *e.g.*, emotion; reflex, as from dyspepsia, cold, or straining; or probably some intrinsic disturbance of the cardiac ganglia. Certain distinct *predisposing causes* have been made out, viz., the male sex; advanced age, the complaint being rarely observed under 45 or 50; and a high social position.

SYMPTOMS.—An attack of angina pectoris comes on as a rule with abrupt suddenness, but warnings of its approach are occasionally present, in the way of curious sensations or slight pain about the cardiac region. The first paroxysm generally sets in while the patient is walking up a hill, against the wind, after a meal, and especially after breakfast.

The chief symptom is an intense pain in some part of the præcordial region, which may amount to the most excruciating torture. In character it is described as shooting, plunging, tearing, aching, gnawing, sickening, or burning, but it is often indescribable. At the same time a feeling of oppression or constriction is experienced across the chest, as if it were being forcibly compressed and could not be expanded, attended with a sense of suffocation and inability to breathe, though this act is not really interfered with, and there is not the least indication of cyanosis. If a deep breath can be taken and held, this may relieve the pain. Usually no tenderness is felt, but pressure rather gives relief, though occasionally tenderness over the sternum and adjoining spaces is complained of. Frequently painful sensations shoot from the heart in various directions, such as down the left arm, or sometimes the right, even to the fingers; up the left side of the neck; directly backwards; or round the side.

There is evidence of grave general disturbance. The face becomes pale and covered with cold sweat; the expression is one of intense anxiety, alarm, and dread of impending death. In most cases the pulse tends to become feeble and even fluttering or irregular if the attack is prolonged. Much will depend on the condition of the heart with which the angina is associated, which also influences the physical signs. Occasionally vomiting and eructations accompany the attack. The patient is quite conscious at first, but in prolonged or fatal cases may

state of syncope, and spasmodic movements or even general
s may be observed.
an entire attack is made up of several brief paroxysms with
ns, but there may be only one; the morbid sensations gener-
suddenly, this being attended with a sense of extreme relief,
re is a feeling of exhaustion afterwards, which may last for
. Very rarely does the first attack prove fatal, but it may
nate, either suddenly or gradually. Probably some cases of
ath are due to angina. A marked character of the complaint
tendency to recur under the influence of very slight exciting

of angina pectoris is described, which is not attended with
ina sine dolore. Here also an affection may be alluded to,
udo-angina pectoris, which is met with among young persons,
nded with sudden pain and unpleasant sensations about the
pitation, disturbance of breathing, faintness and giddiness,
le face, and feeble pulse. The condition of the patient may
be really serious, but very rarely does a fatal termination
his complaint is chiefly observed in connection with anæmia;
rvous disorders, especially hysteria; or blood-diseases, such

ISIS.—True angina pectoris is a very dangerous condition,
hich simulates it is not, therefore it becomes important to
n between them. The presence and nature of any organic
sion will necessarily influence the prognosis materially.
IENT.—1. In order to prevent attacks, any one who is subject
should avoid every possible exciting cause, and it is desirable
ome remedy in the pocket, especially opium, so that it may be
of immediately the least indication appears of the approach of
n. 2. During an attack any obvious source of reflex disturb-
n as indigestible food, must be at once removed. The in-
ternal remedies are sedatives, antispasmodics, and stimulants,
opium in full doses, hydrate of chloral, the various ethers,
n. spirits of ammonia, musk, camphor, and hot brandy and
igitalis and belladonna are very useful in some instances, when
c action is much disturbed. Inhalations of chloroform, ether,
lly nitrite of amyl might be tried carefully in severe cases. Local
ns, such as dry heat with friction, sinapisms, or friction with
a or belladonna liniment may be employed. Gentle galvanism
een recommended. In a gouty person the joints of the feet
irritated. 3. During the intervals the treatment is that which
cardiac affections in general, in the way of regulating the diet
tive organs; attending to the general and constitutional con-
well as that of the blood; and to all hygienic matters. Tepid
aths followed by friction, and change of air and scene are
ficial. A belladonna plaster should be worn constantly over
c region.
udo-angina similar remedies are indicated during a paroxysm,
need not be so powerful. At other times the treatment
lirected to the cause of the complaint, and the condition of

II. SYNCOPE—FAINTING.

The phenomena associated with syncope are due primaril in the action of the heart; which is speedily followed by resulting from anæmia of the nervous centres; and these by monary functions.

ETIOLOGY.—The chief *predisposing causes* of syncope are age; the female sex; a nervous temperament; and weaknes impoverished condition of the blood. *Exciting causes.* So causes below mentioned seem to lead to a condition allied to in which the three chief systems appear to be almost simu affected, though probably the nervous centres are first distur not always easy to determine whether a case should be class of syncope or shock. They may be arranged under the heads:—1. Want of blood in the cavities of the heart, from its walls or of a great vessel, or severe hæmorrhage from a obstruction in the principal veins; or sudden removal of pres the great vessels, as when syncope follows paracentesis abd ascites. 2. Inadequate supply of blood to the cardiac walls obstruction of the coronary arteries; or a supply of impure bl low fevers, or when syncope comes on in a hot and crowd 3. Partial or complete paralysis of the muscular tissue of either from some organic change, or from nervous disturbanc reflex, or intrinsic. Numerous causes of syncope act in this as fatty and other degenerations of the heart, flabby dilata weak state of this organ in certain chronic diseases, *e.g.*, phthisis; sudden reflux of blood in aortic regurgitation poisonous substances, *e.g.*, aconite, tobacco, prussic acid, strong emotion, and severe cerebral lesions; long continuance bath; reflex disturbance from bad smells or unpleasant sounc any kind; extensive burns; passage of a catheter; a sho sympathetic trunk, as from a blow in the epigastrium; dri water when heated; taking indigestible food; or over-e fasting. Lightning sometimes kills in this way. 4. Contir modic contraction of the heart, *e.g.*, in angina pectoris prc Mechanical pressure outside the heart, as in some cases of cardial effusion.

ANATOMICAL CHARACTERS.—The state of the heart varies ably according to the cause of the syncope. After great loss it is usually contracted and empty. When the walls are par cavities are dilated and contain more or less fluid or coagula The lungs are usually anæmic, and the nervous centres marke

SYMPTOMS.—Syncope may come on quite suddenly, or e instantaneous death. In many cases, however, it is gradual in there being premonitory symptoms before actual insensibili These are a sense of faintness, giddiness, and trembling, with the epigastrium, nausea, and sometimes vomiting; pallor, es the face, with drawn features; chilliness and shivering, or in s a sense of heat, there being at the same time cold, clammy tions; a very rapid, small, and weak pulse, tending to become and slow, though the large arteries may throb; hurried, irr gasping breathing, often attended with sighing; great restlessness, and occasionally slight convulsive movements; mental confusion; and disturbance of the senses of sight and hearing, indicated by more or less [illegible] vision, extreme sensibility to light, and noises in the ears. When the syncopal state is complete, the symptoms are absolute insensibility, with dilatation of the pupils; death-like pallor, with cold and clammy sweats; a slow and extremely weak, irregular, or actually imperceptible pulse; infrequent, irregular respiration, which may ultimately cease altogether. Not uncommonly convulsive movements are observed, and the sphincters may be relaxed, with involuntary discharge of fæces and urine. Examination of the heart reveals feebleness or complete absence of impulse and sounds, especially the systolic.

This condition lasts a variable time, and either ends in death or recovery. In the latter case very uncomfortable sensations are usually experienced as the patient returns to consciousness, this being often attended with palpitation, vomiting, or convulsive movements.

TREATMENT.—Any obvious reflex cause of syncope should be at once removed. It is most important to attend to the posture of the patient, which should be horizontal, with the head low. Fainting may not uncommonly be prevented by bending forwards, and hanging the head down between the knees as far as possible. All clothes should be loosened, and plenty of fresh air admitted. The application of ammonia to the nostrils; dashing cold water in the face; or friction along the limbs and over the heart, either with the hand alone or with stimulating liniments, will often restore vitality. The internal administration of stimulants, such as brandy, wine, ammonia, ether, musk, is most useful, and if they cannot be swallowed and there is any danger, stimulant enemata should be employed. Attempts may be made to confine the blood to the central organs, by making pressure on the arteries of the limbs by the aid of the fingers or tourniquets, warmth being maintained by means of hot bottles and friction. Sinapisms or turpentine stupes over the heart should be employed if necessary, and in dangerous cases regulated galvanism along the pneumogastric nerves, artificial respiration, and transfusion are the most potent remedial means available. The last is particularly valuable if the syncope is due to great loss of blood.

III. PALPITATION.

ETIOLOGY.—Formerly palpitation was regarded as evidence of cardiac excitement and increased action, but the tendency now is to regard it as in most cases indicative of a want of power and of laborious effort on the part of the heart, this organ being taxed beyond its powers. The individuals in whom it is most frequently met with are young adults and persons beyond middle age; females; nervous persons; and fat flabby people, who live highly, take but little exercise, and suffer habitually from dyspeptic disorders.

Exciting causes. Palpitation may occur under a great variety of circumstances, but its causes may be thus arranged:—1. Acute or chronic organic diseases of the heart or pericardium. These may induce palpitation either from the muscular tissue being involved and so more or less paralysed; or from there being some obstruction to the circula-

tion which the heart cannot overcome. When it accomp
trophy it is presumed to be due to the fact that this is
compensatory, and may indicate commencing degenerati
chanical interference with the cardiac action, as from
distorted chest; displacement by pleuritic effusion; abdom
ments, of which flatulent distension of the stomach is a co
3. Diseased condition of the vessels, with inadequate c
hypertrophy of the heart, *e.g.*, atheroma, calcification, or hy
the arterial coats in Bright's disease. 4. Chronic affections
which interfere with the circulation, such as bronchitis and
5. Some abnormal state of the blood, either as regards its
quality, *e.g.*, plethora or anæmia; the condition associatec
renal disease, or fevers; and, probably, the admixture of ma
into the system from without. There is a difficulty in dr
blood under these circumstances, and thus the heart is easi
while at the same time it is itself supplied with impure
Causes acting through the nervous system, either centric o
continued cerebral excitement or mental labour; emotion
nervous disorders (hysteria, epilepsy, chorea, neuralgia);
tea, alcohol, or tobacco; reflex disturbance originating in th
canal, as from eating indigestible food; or in connection wit
organs. The view has been advanced that this nervous
chiefly due to spasmodic contraction of the arterioles, whe
culty in the passage of the blood is induced. It is very like
that the innervation of the heart itself is also disturbed, its
thus rendered less efficient.

In some cases palpitation is present at all times more or
it is aggravated by anything which throws extra work upo
such as slight exertion. In other instances it is only parox
brought on by some evident exciting cause, or independentl

Irregularity is a form of cardiac disturbance often exist
accompanying palpitation, and it is a still more serious i
want of power. It may affect only the rhythm, the forc
Rhythmical irregularity is due to a halting, hesitation, or par
the ventricular contraction, which may be brought about b
ance of the balance of power between the vagus and cardiac
more commonly between the opposition offered to the
driven and the power to drive it (Fothergill). It is oft
necessarily, associated with grave organic disease, especially
or with low conditions of the system, such as malignant f
irregularity may appear to be of a hesitating or anticipating
sometimes it passes through regular cycles, but in other case
action seems entirely confused.

Intermittency is the most advanced evidence of cardiac
signifies that there is a complete arrest in the ventricular c
until two or sometimes more auricular contractions have occ
are required before sufficient blood is sent into the ventricle
into activity. The conditions with which it may be associat
degeneration of the heart; aortic obstruction; hypertrophy
tion; irritation of the vagus nerve, either at its root fr
disease, or in its course from pressure of a tumour; th

severe fevers; diseases of the lungs causing great obstruction,
entricle being disturbed under these circumstances along with
; or mere nervous disturbance of the heart. It may even be
on voluntarily, by holding the breath.

roms.—Palpitation is generally accompanied with increased
y and quickness of the heart's beats, especially when a severe
n comes on. The action may be quite regular; or be attended
ious forms of irregularity or with intermittency. There is also
ly some inequality in force. Various unpleasant subjective sen-
are experienced over the cardiac region, the patient being
is of the heart's action, and this is associated with a sense of
jogging, sudden falling back, jumping into the throat, and other
ble feelings—*præcordial distress* or *anxiety*. There may be
able pain, almost anginal, which is relieved in some cases by
. Severe paroxysms are often attended with very serious symp-
e., faintness, occasionally ending in actual syncope; dyspnœa,
ried breathing, and an inability to "catch the breath;" flush-
he face, with a sense of heat, headache, giddiness, disturbed
nd noises in the ears; cold extremities. Sometimes there is
xiety and fear of dissolution. The radial pulse usually corre-
o the heart's beats, but not always; it is in many cases small
k, even when the heart is acting violently and the large arteries
ing generally also quick and sharp.

uration and severity of a fit of palpitation vary greatly, the symp-
ng more serious usually when there is irregularity. It is often
ed by profuse diuresis of light-coloured urine; or a sense of
haustion follows, which calls for a prolonged sleep. The palpi-
ie to drinking strong tea is sometimes of a very distressing
. Occasionally it is constantly present in great intensity apart
organic disease, of which I have met with some well-marked
young women. In many of these it was a part of Graves's
ut not always.

al signs will of course depend upon whether the heart is or-
affected or not. The signs which may be due to mere palpi-
as follows:—1. Impulse is too extensive; often strong, but
ing: and may be irregular in rhythm and force, jogging or
. 2. Dulness is occasionally increased towards the right in
l cases, from over-distension of the right cavities with blood.
-sounds are often louder than natural, with a great tendency to
tion. 4. Occasionally a temporary systolic murmur may be
the base of the heart or at the left apex, the latter arising from
action of the musculi papillares.

ittent action of the heart is sometimes attended with the most
and horrible sensations, there being an intense dread of im-
lissolution.

osis.—The important matter to determine is whether these
ces of the heart's action are due to organic disease or not, and
nly be done satisfactorily by thorough physical examination,
king into consideration all the general circumstances of the
ie impulse of palpitation differs from that of hypertrophy in
heaving in quality.

tincture of lavender, galbanum, or assafœtida, as
which act upon the heart directly, especially digi
heat or sinapisms over the præcordial region; with
mities, if required.

2. During the intervals, as well as in chronic case
look to the state of the heart, digitalis being often
improving its action: to avert every possible cause o
by removing mechanical pressure, attending to the
organs, and regulating the habits generally, especially
the use of alcohol, tobacco, or tea, as well as over-stu
of mental excitement, and venereal excess: to treat
diathesis, such as gout: and to improve the condi
generally, but especially that of the nervous system a
mineral tonics, mineral acids, quinine, strychnine
vomica, various preparations of iron; and ordering c
with friction, a proper amount of exercise, and chang
A mixture containing tincture of steel, nux vomica, a
most beneficial. A belladonna plaster may be wo
the cardiac region. The same principles of treatme
the other forms of cardiac disturbance.

Chapter XX.

DISEASES OF THE PERICARDI

I. Acute Pericarditis.

tubercle. 6. Idiopathic pericarditis has been described, re-
m "cold;" but it is extremely doubtful whether the affection
s from this cause alone.

MICAL CHARACTERS.—The morbid appearances are similar to
rved in other serous inflammations, and they run a similar
The exudation is generally deposited on both surfaces, but is
ore abundant on the visceral portion of the pericardium;
t observed over the whole extent of the sac, being generally in
nd it may be confined to a small area, especially about the
els. The thickness and mode of deposit are very variable,
being stratified, or presenting little elevations, ridges, bands,
nd numerous other arrangements. Usually the material is
consistent, and sometimes quite tough, adhering fairly to the
In low conditions it may be soft and granular. The effusion
lly sero-fibrinous, with flocculi floating in it; in exceptional
ay have blood or pus mixed with it, and in extremely rare
is actually purulent. The quantity is not usually above from
velve ounces, but may range from an ounce or two to three
ore. Gas is sometimes present from decomposition of the
ughing of the membrane is said to occur occasionally.

ocesses of absorption and adhesion are precisely identical
described under pleurisy. The adhesions may be merely in
f loose bands, or of extensive agglutinations of the two sur-
the inflammatory irritation sometimes extends through the
m, so as to cause its union with the chest walls. When
ut the great vessels, the lymph often leads to their adhesion
nother; or it may remain as a hard mass of considerable

may here be made to the so-called "white patches" on the
m. As a rule these are decidedly merely due to friction; but
they are the remnants of inflammation.

MS.—It is in the course of acute rheumatism or Bright's to the most intense suffering. Tenderness is experienced as a ru the spaces, as well as in some instances when upward pressure is over the epigastrium. The disturbed cardiac action is indica palpitation, sometimes violent. An attack of pericarditis m ushered in by slight rigors, followed by pyrexia. In practice, ho these phenomena are frequently absent, there being no increase o previously existing. The pulse is necessarily hurried, and may b frequent.

When fluid accumulates the pain generally subsides, but the ac the heart is interfered with, as well as the functions of neighb structures, in proportion to the quantity of the effusion. Hence symptoms may arise, indicating a tendency to syncope; loading right heart and venous system; interference with the respiratory tions; or severe nervous disturbance. The pulse often become frequent, feeble, small, and in bad cases irregular. Sometimes it and laboured. Dyspnœa is present, and may be extremely amounting to constant or paroxysmal orthopnœa, with a sense of oppression across the chest. A dry, irritable, spasmodic cough uncommonly observed. In grave cases the face assumes a very a and distressed expression, and becomes pale or more or less cya the expired air is cool; and the extremities feel cold. The mode cumbency is generally on the back, with the head high; some p prefer lying on the left side, others on the right; while occas they are obliged to be propped up or even to bend forwards. quently there is much restlessness, if the patient is not prevented moving, on account of rheumatism. Headache and sleeplessne common, and among occasional severe nervous symptoms m delirium, occasionally almost maniacal; stupor; subsultus ten and jactitation: clonic or tonic spasms; choreiform or epilep symptoms: and dysphagia. In most cases, however, these pro depend rather on the general condition with which the pericar associated. Vomiting is sometimes a prominent symptom. S death take place, it usually results from syncope, which may be su from making the patient assume a sitting position when the perica is very full of fluid; interference with the aëration of the bloo with the circulation, the lungs becoming œdematous, and dropsy s in; or from nervous disturbance.

PHYSICAL SIGNS.—In the early stages the only reliable signs of carditis are:—1. Excited action of the heart, as evidenced b impulse. 2. Pericardial friction-fremitus, which is extremely rar Pericardial friction-sound. It must be mentioned, however, friction-sound may be absent, either on account of the soft nature lymph, or of its being deposited only on one surface or at the b the heart.

In the effusion stage the *physical signs* will be in proportion t quantity of the fluid, and are of the following nature:—1. Bulgi the cardiac region, especially in young persons. This may extend the 2nd to the 6th or 7th cartilage, the spaces being widened or protruded, and sometimes the left edge of the sternum is pushe wards. Local measurements are increased. 2. The impulse pr several important changes. *a*. It is displaced, usually upwards a the left, but sometimes downwards; while it is altered by change of posture. *b.* Its force is much diminished, and the impulse may be visible when not perceptible to the touch. Often it can be felt in the erect or sitting posture, when absent in the lying posture. There is sometimes great irregularity in force. *c.* In rhythm the impulse tends to be delayed slightly after the systole; it may be extremely irregular. *d.* The character is undulatory when there is much fluid, this being observed over a variable area, and being modified by position; the undulations usually appear to pass from below up and from left to right, but they may have a horizontal direction. 3. Cardiac dulness is materially altered in extent, degree, and shape. It increases first about the base of the heart, extending upwards and then laterally. Usually it does not pass below the 6th rib, but in extreme cases may reach considerably lower than this, the fluid pushing down the diaphragm and causing protrusion of the epigastrium. In an upward direction it may extend as high as or even above the clavicle; and transversely from the right border of the sternum to beyond the left nipple. A very important character may be observed when the fluid is abundant, viz., that dulness extends to the left beyond the apex-beat. The shape of the dulness is more or less triangular, with the apex upwards. Its intensity is unusually marked. Change of posture will modify it; the area is larger in the lying than the erect position, but if the amount of fluid is not very great, it extends higher in the latter posture. 4. The heart-sounds are more or less feeble at the apex and appear deep; but on passing the stethoscope upwards towards the base, they become louder and more superficial. Change of posture may influence them. 5. It is said that a basic systolic murmur is heard occasionally, due to pressure on the aorta. 6. Friction-phenomena often persist for a variable time while fluid is accumulating, becoming by degrees less marked, or being only observed in certain positions. 7. Pericardial effusion will necessarily affect neighbouring structures, especially the lungs. Vocal fremitus and resonance, as well as breath-sounds, are diminished in area over the cardiac region; ægophony is occasionally heard above and to the left, while vocal resonance is intensified on the borders of the dulness. Dulness at the base of the left lung may possibly be observed, from partial collapse, the result of pressure on the bronchus or lung. The liver and spleen are in some cases depressed, along with the diaphragm.

Should absorption take place, the signs become gradually normal in favourable cases, and it is only requisite to notice that the dulness diminishes from above and laterally; and that the friction signs return, usually in an increased degree, the sound also assuming more of the "churning" and "clicking" characters. The phenomena indicating chronic adhesions will be hereafter considered.

DIAGNOSIS.—In the early period the chief matter in diagnosis is to distinguish pericarditis from endocarditis. Symptoms are by no means reliable, but severe local pain would be in favour of pericarditis. The diagnosis, however, must be founded on the different characters of the morbid sounds present in each case, being aided occasionally by the existence of friction-fremitus. When any difficulty is experienced, which is not uncommon at first, the case must be thoroughly watched in its further progress. Pericardial friction might be mistaken for pleuritic of cardiac rhythm; or it might be simulated by œdematous integuments, fluid in the mediastinum, or the friction of a cirrhosed liver.

Pericardial effusion is most liable to be mistaken for cardiac enlargement, but the circumstances under which it arises, with the symptoms and physical signs which characterise this condition, ought rarely to leave any doubt as to the diagnosis. The dulness of pericardial effusion might be confounded with certain extrinsic conditions, which will be again pointed out; the distinctions between inflammatory effusion and mere hydropericardium will be indicated under the latter.

TERMINATIONS.—Pericarditis may end in practical recovery, generally, however, some adhesions remaining; in death; or by becoming chronic, either the effusion remaining and in rare instances becoming purulent or even pointing on the surface, or extensive agglutinations forming, which greatly disturb the cardiac action. As a consequence hypertrophy or dilatation may follow; or in exceptional cases atrophy or fatty degeneration, owing to pressure on the coronary arteries.

PROGNOSIS.—The immediate prognosis will depend upon the condition with which the pericarditis is associated, it being, for instance, very dangerous in Bright's disease; the amount and nature of the effusion; the previous condition of the heart; the state of the pulse, as indicated especially by the sphygmograph; whether the disease is complicated with other inflammations; and the severity and character of the symptoms. Marked nervous symptoms are of very serious import. The ultimate prognosis will be entirely governed by the conditions left behind; extensive agglutination, and permanent displacement of the heart owing to adhesions are untoward events.

TREATMENT.—The principles of treatment in pericarditis are similar to those mentioned for pleurisy, but as the former occurs almost always in the course of some other complaint, its management must be modified accordingly. When it occurs during acute rheumatism, the treatment for this affection must be persevered in, and opium given freely for the purpose of calming the excited action of the heart, care being taken, however, to avoid narcotising the patient should there be cyanotic signs. Venesection and mercurialisation are never admissible. A few leeches may be sometimes beneficial in robust subjects, but as a rule the persistent application of heat and moisture over the præcordial region, by means of linseed poultices or fomentations, is the most serviceable local treatment. Great care must be taken that the applications are frequently changed; and that the chest is not unduly exposed and chilled. Cold is strongly recommended by some observers, as strongly condemned by others; it certainly should only be tried very cautiously. Aconite, veratria, and tartar emetic have also been given to calm the heart's action, but these are dangerous remedies in pericarditis.

For the removal of effusion, the application of blisters or strong iodine may be tried, if necessary; with diuretics and iodide of potassium internally. Tincture of iron in full doses is decidedly a valuable drug at this time, and tonics are often useful.

As a rule a good quantity of nourishment is required, and often a le stimulant is indicated; if there is much depression, with a failing lse, a considerable amount of brandy may be necessary, and digitalis highly spoken of under these circumstances. The patient must not examined unnecessarily or made to sit up, should there be any nger of syncope.

Paracentesis is called for in rare instances, in order to relieve danrous symptoms, or to remove purulent fluid. Some advocate early course to this operation, but for obvious reasons it ought not to be shly practised. The fluid is best removed by the aspirateur.

In pericarditis complicating Bright's disease or low fevers free stimuation is usually required, while opium is contra-indicated or must be mployed with exceeding caution.

II. CHRONIC PERICARDITIS—ADHERENT PERICARDIUM.

ANATOMICAL CHARACTERS.—Chronic effusion may remain after pericarditis; or sometimes the surfaces of the membrane become universally agglutinated, and calcareous matter may be deposited in the adhesions; or the outer surface of the pericardium may unite with the chest-wall.

SYMPTOMS.—Subjective symptoms are often absent, but there may be neasy sensations or even a dull pain in the cardiac region, and, in xceptional cases, anginal attacks have been noticed. Disturbed action f the heart; palpitation easily induced; and shortness of breath on xertion are the chief symptoms complained of, if any. From the ffects of extensive adhesions upon the heart grave interference with ts action and with the circulation may ultimately arise. An agglutiated pericardium will seriously increase the danger from an attack of ny pulmonary inflammation.

Physical examination may reveal fluid in the pericardium, or when adesions have formed between its surfaces, as well as with the chest-wall, he signs are more or less of the following character:—1. Depression of he præcordial region, with narrowing of the spaces. 2. Increase in exent or permanent displacement of the impulse, especially elevation, withut there being any obvious cause for this; the apex-beat being unaltered y change of posture or by a deep inspiration; or the impulse having ltogether unusual characters, being attended with recession of the spaces r epigastrium, or with an irregular jogging movement, both systolic and liastolic. 3. Usually increased area of dulness, which is not altered fter a deep breath, there being other signs that the lungs do not xpand over the cardiac region. When there is external calcification, he percussion-sound is said occasionally to have an osteal character. . Some variety of friction-sound may be heard.

III. HYDROPERICARDIUM.

The important facts relating to this condition may be thus summed p, and it will at once be seen in what respects it differs from inflammaory effusion. 1. In the great majority of cases hydropericardium is a art of chronic general dropsy; it has been stated that it may set in acutely in Bright's disease; and rare instances have been met with in which it was mechanical in its origin, having resulted from the pressure of an aneurism or mediastinal tumour, disease of the cardiac veins or their obstruction by a clot, or after sudden extreme pneumothorax. 2. There are no severe initiatory symptoms or pyrexia; nor is there any marked disturbance of the heart's action. 3. The effusion, which is simply serous, is not abundant; hence there is no bulging; the physical signs indicative of fluid are less marked; and the dulness is more liable to be altered by posture. 4. Friction signs are absent throughout. 5. Hydropericardium generally follows hydrothorax, and hence it is preceded by the symptoms and physical signs of the latter, the effects of which it necessarily tends to aggravate.

TREATMENT.—This is merely a part of the ordinary treatment for dropsy. Paracentesis might possibly be required.

IV. PERICARDIAL HÆMORRHAGE.

Blood may be found in the pericardium as the result of:—1. Spontaneous rupture, either of the heart or a cardiac aneurism; an aortic aneurism; one of the coronary vessels; or of vessels in cancerous deposits. 2. Injury. 3. Pericarditis, the effusion being more or less hæmorrhagic. 4. Diseased conditions of the blood, such as scurvy and purpura.

The *symptoms* are generally severe, indicating loss of blood and interference with the heart's action; but they will necessarily vary with the amount of blood present, and the rapidity of its accumulation. Sudden death may occur. The *physical signs* are those of pericardial accumulation.

V. PNEUMO-PERICARDIUM.

Gas is occasionally found in the pericardium, either having entered from without, or resulting from decomposition of fluid. It may give rise to tympanitic resonance, and to succussion-splash if mixed with fluid.

CHAPTER XXI.

ACUTE INFLAMMATIONS OF THE HEART.

I. ACUTE ENDOCARDITIS.

ETIOLOGY.—Almost invariably this affection is associated with some disease in which the blood contains a morbid poison, especially acute rheumatism, occasionally Bright's disease, pyæmia, septicæmia, scarlatina, small-pox, typhoid fever, puerperal fever, and other pyrexial diseases. Probably it results from direct irritation of the endocardium by the contaminated blood.

ANATOMICAL CHARACTERS.—It rarely happens that the endocardium is seen in the early period of inflammation, when it merely presents bright redness, usually with distinct points of increased vascularisation.

nembrane becomes less smooth, swollen and clouded, less
and loses its polish. Numerous young cells form in the
al tissue, causing it to become thickened, and little vascular
nulations also project on the surface. In some cases the
m assumes the appearance of a soft, velvety membrane.
vegetations are soon formed, which are derived directly from
. the fibrin of which is deposited on the inflamed membrane,
trata or in masses of considerable size. Only the left cavities
art are usually involved, the orifices and the membrane in
nity, with the valves and their appendages, being especially

During intra-uterine life endocarditis chiefly attacks the
. The free edges of the valves are much thickened, espe-
se parts which are exposed to considerable friction and irrita-
the fibrinous vegetations are chiefly deposited on the surface
opposed to the current of the circulation.

casional consequences of acute endocarditis there may be ob-
suring of the membrane; actual ulceration from softening and
on of tissue, the ulcers being irregular, superficial, and having
d edges; formation of pus in the deeper layers, ultimately
the surface: perforation, rupture, or extensive destruction of
rupture of one or more chordæ tendineæ, the free ends of
ay float in the blood, and lead to the deposit of vegetations;
rmation of an aneurism of the heart.

h are very liable to be detached from the fibrinous deposits,
ences of these may be seen in distant organs; or some of the
of inflammation may be conveyed into the circulation and
to septicæmic signs in various parts.

inflammatory process subsides, the young tissue developes into
rfect fibrous structure, and proliferation may go on for some
s leading to most serious permanent organic changes, fatty and
s degeneration often finally occurring, which increases the

This is one of the conditions known as *chronic endocarditis*,
affection may be chronic from the outset, there being a slow
of new tissue which tends to develope into a fibroid material.
mate changes are similar in both cases, and the chief morbid
ns resulting therefrom are as follows:—1. Thickening, indura-
d puckering of some part of the general tract of the endo-
. 2. Thickening of the valves, with opacity, rigidity, and more
rinking, by which they may be greatly narrowed and rendered
tent. 3. Adhesion of the tongues of a valve to each other or
alls of the heart. 4. Thickening, induration, and contraction
horde tendineæ or musculi papillares. 5. Narrowing of the
usually accompanied with irregularity, roughness, and harden-
Formation of firm warty growths, either sessile or peduncu-

atheroma and calcification take place, the structures present
d characters which indicate these degenerations.

roms.—Many cases of endocarditis are only revealed by physical
tion. *Local* symptoms are always very indefinite, there being
no pain or tenderness, but palpitation is frequently present. The
rs of the pulse have been variously stated by different obser-

vers; at first it is usually frequent, full, and excited; afterwards it may become feeble, small, and irregular in force and rhythm, but various circumstances influence it. Increased pyrexia may accompany endocarditis, the fever tending to assume an adynamic type. The chief symptoms which may arise in its course, however, are those dependent upon—(*a*) interference with the circulation at one of the orifices; (*b*) formation of extensive clots in the heart, causing obstruction, and indicated by extremely frequent and irregular cardiac action and pulse; tendency to syncope; great dyspnœa, amounting to orthopnœa in paroxysms, attended with extreme anxiety, and followed by asphyxial symptoms; and severe disturbance of the nervous system; (*c*) the conveying of emboli to the spleen, kidneys, brain, and other organs; or of deleterious inflammatory products, the latter giving rise to symptoms of septicæmia.

PHYSICAL SIGNS.—The only positive signs associated with endocarditis are those indicating excited action of the heart; some derangement at an orifice; or extensive coagulation. 1. The impulse is forcible and increased in area; if coagulation takes place, it tends to become irregular in rhythm and force. 2. Increased dulness, especially towards the right, may arise from stagnation of blood and coagulation. 3. The sounds are often altered in character, but this is not to be relied upon. 4. The great sign is the presence of one or more murmurs, but it must be remembered that these may have previously existed. Different observers have given different statements as to the valvular lesion most frequently present. In my own experience *mitral regurgitation* has been decidedly the most common condition in acute endocarditis, but this may in some cases result from irregular action of the musculi papillares. *Aortic obstruction* is not uncommon. *Pulmonary obstruction* murmur may be observed as the result of coagulation in the right cavities; but on the left side this condition sometimes interferes with the production of a murmur.

DIAGNOSIS.—Not only must endocarditis be distinguished from pericarditis, but it must be remembered that the symptoms arising in its course may cause it to be mistaken for some low fever; and that physical examination should be made at frequent intervals in those diseases in which it is liable to occur, so that it may be detected as soon as it supervenes.

PROGNOSIS.—There is always much immediate danger in connection with acute endocarditis. The remote prognosis will depend on the organic changes remaining, and on the orifice which is affected.

TREATMENT.—The treatment of endocarditis is mainly that of the disease in the course of which it occurs, and there are no direct remedies for this condition. Such measures as bleeding, mercurialization, and application of cold are decidedly to be deprecated. As a rule stimulants are required, in some cases in large quantities, along with abundant nutriment. Digitalis is indicated if the heart's action is failing. Should there be signs of obstruction from coagulation of blood in the cavities, alkalies and carbonate of ammonia should be given freely, along with alcoholic and other stimulants. Septicæmic symptoms must be treated should they arise.

II.—ACUTE MYO-CARDITIS.

OGY.—Inflammation of the heart-substance is frequently set up
yers contiguous to an inflamed endocardium or pericardium. It
i stated to have arisen independently in a few instances, either
fuse or localised inflammation, the latter having terminated in
Pyæmia and septicæmia frequently lead to myo-carditis, with
n of abscesses.

OMICAL CHARACTERS.—Myo-carditis is attended with discolora-
l softening of the heart-substance, which is infiltrated with a
guineous fluid, exudation, or sometimes pus, which may collect
sses. It may lead to the formation of a cardiac aneurism; or to
of the walls of the heart. If recovery takes place, depressed
y be left.

OMS.—The clinical signs of myo-carditis are very obscure. It
render the cardiac action extremely weak and irregular, and
s is a prominent feature in the course of peri- or endocarditis,
on of the heart may be suspected. The general symptoms are
of an adynamic type; with signs of blood-poisoning and

MENT.—The only hope lies in free stimulation.

CHAPTER XXII.

CHRONIC DISEASES OF THE HEART.

present chapter it is proposed to give an account of the
hronic morbid conditions to which the heart is liable. Their
s. prognosis, and treatment will be considered in a separate

I. AFFECTIONS OF THE VALVES AND ORIFICES.

AL ETIOLOGY AND PATHOLOGY.—The various conditions which
rise to cardiac murmurs have previously been pointed out, and
acters of the different murmurs described (pages 425—427).
nt attention will be directed only to those cases in which there
lefinite organic mischief about the valves and their appendages
ifices of the heart, which interferes with the circulation, either
g obstruction or by permitting regurgitation. In the first place
well to give a general summary of the pathological modes of
these derangements. They may arise from:—1. Acute endo-
specially, but not solely, in connection with acute rheumatism.
ic endocarditis or valvulitis, which in many cases appears to be
process of fibroid degeneration, the parts affected being very
ndergo further degenerative changes in the direction of atheroma
ication. This is observed as a rule in persons advanced in
ecially in gouty subjects, or those suffering from chronic renal
t may also occur in younger individuals who are subject to
ysical strain, in consequence of which great pressure of blood
upon the aortic valves, *e.g.*, strikers, colliers, gymnasts, or

boat-racers. 3. Laceration of a valve from injury. 4. Chronic m carditis involving the musculi papillares, which become contracted a indurated, preventing the valves from closing. 5. Atrophy of t valves, or, as some suppose, congenital insufficiency, rendering th inefficient, or giving rise to so-called "reticulation" or more or l extensive perforation. 6. Enlargement of the cavities of the he involving the orifices without proportionate increase in the valv which are therefore rendered incompetent; or altering the normal re tions of the valves and their appendages to the orifices. 7. Congen malformations, which are supposed to result mainly from endocard occurring during intra-uterine life. 8. Fibrinous deposits from t blood. 9. Tumours very rarely.

It must be mentioned that more than one orifice may be affec from the same cause; and that disease at one orifice may set up misch in another, either by direct extension, by throwing an extra strain up the valves and thus inducing chronic valvulitis, or by enlarging the cavi

SPECIAL VALVULAR DISEASES.—Having given this general outli the main facts connected with each orifice will now be considered detail, under the following headings:—1. Special etiology. 2. An tomical characters. 3. Clinical phenomena, including the signs i mediately connected with the lesion; its direct influence upon t circulation and symptoms resulting therefrom; and its remote eff upon the heart. It must be remarked at the outset that local symp are very uncertain. Uneasiness or pain may be present, but is o absent; it is most frequent in connection with aortic disease. Pal tation and dyspnœa are common symptoms, and frequently render t patient incapable of exertion.

I. MITRAL REGURGITATION. ETIOLOGY.—1. Acute endocarditis the ordinary cause of this condition, the subsequent chronic chang increasing the primary mischief. 2. Cases occasionally are met with which no history can be obtained of acute endocarditis, and the affe tion seems to have been chronic and gradual in its progress from t first. 3. Mitral regurgitation is liable to supervene upon aortic disea being produced in one of the ways already indicated. 4. Very rarely may result from mere dilatation of the left cavities, causing enlargem of the orifice, and displacing the musculi papillares.

ANATOMICAL CHARACTERS.—Among the chief morbid conditio observed in different cases are more or less contraction and narrow of the tongues of the valve, with irregularity, thickening, and rigid there being in some instances scarcely any appearance of a valv atheroma or calcification; laceration of one of the tongues; adhesion one or more of them to the inner surface of the ventricle; rupture chordæ tendineæ; shortening, thickening, induration, or adhesion these, the smaller ones having often entirely disappeared; contract and hardening of the musculi papillares; and deposits of fibrin, som times in considerable abundance.

CLINICAL PHENOMENA.—*Immediate signs.* These are:—1. A syst thrill at the left apex, present in a certain proportion of cases Mitral systolic murmur. 3. Intensification of the pulmonary sec sound, which is louder than the aortic.

Influence upon the circulation.—The arterial system will be insuffici irregularly supplied; hence the pulse is small, weak, and often qual in force and fulness, not unfrequently also irregular in rhythm. se characters are shown in the sphygmographic tracing. Two ing phenomena are sometimes observed in connection with mitral rgitation, viz., that there is an extremely anæmic appearance; and , though the heart may be acting violently, and the great arteries in neck may even appear to throb, scarcely any pulsation is felt in a. Through the "back-working" of mitral regurgitation the pul- ary circulation becomes necessarily overloaded more or less speedily, symptoms and ultimate consequences of which have been already ribed. Emboli may also be carried from clots in the right heart, give rise to pulmonary infarctions. In time the right side of the t and general venous system become involved, venous hyperæmia its consequences being induced, often to an extreme degree.

mote effects upon the heart.—The left auricle becomes first the seat latation with hypertrophy, and afterwards the right ventricle, which en greatly enlarged, and as a consequence tricuspid regurgitation rs. A moderate degree of enlargement of the left ventricle is generally observed. Degeneration is liable to be set up in time, and the cardial lining of the left auricle tends to become thickened, opaque, atheromatous.

MITRAL OBSTRUCTION. ETIOLOGY.—This condition is always the t of acute endocarditis and its consequences.

ATOMICAL CHARACTERS.—The mitral orifice is more or less in a of constriction or *stenosis;* as well as rough, irregular, and thick- ; one or other of these conditions predominating. Occasionally lves adhere together, and a funnel-shaped opening may be thus ced. Abundant vegetations on the valves or about the orifice ause obstruction.

NICAL PHENOMENA.—These differ from those accompanying mitral gitation in the following particulars.—1. Thrill is much more fre- ly felt, and is præsystolic. 2. The murmur is præsystolic or post- lic, and differs in its characters. 3. The pulse is regular. 4. The ntricle is small and disposed to atrophy. The effects on the tion are similar in both cases.

not a few instances mitral regurgitation and constriction exist er. The interference with the circulation and the changes in the s of the heart are necessarily more easily induced under these stances. Frequently there are two distinct murmurs, but there but one. Mitral disease is common in young persons.

AORTIC OBSTRUCTION. ETIOLOGY.—1. As a rule chronic valvu- ding in atheroma and calcification, originates aortic obstruction, rbid process being gradual, and hence it is very frequent in old It is this valve also which is affected in those who undergo nuscular strain. 2. Cases are not uncommonly observed, how- which it can be distinctly traced to acute endocarditis.

OMICAL CHARACTERS.—In most cases the obstruction depends e valves, which project inwards, and become rigid, thickened, opaque, contracted, atheromatous or calcareous, so that they e pressed back, but remain constantly in the current of the cir- Often they are covered with considerable fibrinous masses, and the opening of the artery may thus be almost completely closed. Occasionally constriction at or about the aortic orifice is the pathological condition giving rise to obstruction.

Clinical phenomena.—*Immediate signs.* These are:—1. Systolic thrill at the right base sometimes. 2. Aortic systolic murmur. 3. Feebleness or absence of the aortic second sound if there is no regurgitation; that over the pulmonary artery being unaffected.

Influence upon the circulation.—The arteries being imperfectly filled, there is often pallor, with a tendency to symptoms of cerebral anaemia. The pulse is small, regular, and compressible, but is generally modified by hypertrophy or degeneration, and under the influence of the latter it may become intermittent. A sphygmographic tracing shows a difficult and very oblique ascent; a round summit; and the secondary waves absent or slight. There is no evidence of obstruction to the pulmonary circulation, unless the mitral orifice becomes involved, so as to allow regurgitation. It is important to notice that particles of fibrin are very liable to be detached from the valves, and thus to give rise to signs of embolism, especially in connection with the brain.

Effects on the heart.—The tendency of aortic obstruction is to produce pure hypertrophy of the left ventricle, which compensates for the obstruction so long as there is no degeneration. In time mitral regurgitation is apt to follow, being set up by extension of disease from the aortic valve; or by the forcible pressure of the blood upon the mitral valves.

IV. Aortic Regurgitation. Etiology.—1. This is also usually the result of chronic changes, and is especially frequent in those who undergo violent strain. 2. Occasionally it follows acute endocarditis. 3. There may be a sudden rupture or laceration of the valve, from extreme pressure thrown upon it. 4. Regurgitation may take place through perforations in the valve, the result of atrophy or congenital insufficiency. 5. In rare instances the orifice is dilated, and the valves therefore cannot close it. 6. Degeneration at the root of the aorta may lead to the imperfect adaptation of the valves, and thus give rise to regurgitation.

Anatomical Characters.—The ordinary state of the valves is that described under aortic obstruction, and they are often so shrunken, deformed, and rigid, that they permit regurgitation as well as cause obstruction. Sometimes they adhere to the walls of the vessel; or a tongue is seen lacerated, or having a considerable perforation in it; or there may be scarcely any remnants of the valve.

Clinical phenomena.—It will be sufficient to point out the important characters which distinguish regurgitation from obstruction. 1. Very rarely is there any thrill, but possibly a diastolic thrill may be felt. 2. A well-marked diastolic murmur is generally present. 3. The pulse is quite characteristic, owing to the blood being forced into the vessels under unusual pressure, causing their excessive distension, but they rapidly subside, however, on account of the regurgitation. This can be observed in all the arteries, and has even been seen in the eye by the aid of the ophthalmoscope. They are visible, tortuous, elongated, and moveable with each systole of the heart; the pulse having a jerking, abrupt, and hard feel, succeeded by a rapid subsidence or "fall-back;" the sensation has been well described as resemballs of blood shot under the finger." There is no irregularity so s the heart tissue is healthy. The important characters of the ographic tracing are, that the line of descent falls suddenly, and aortic wave is more or less indistinct or absolutely wanting. By ng this the degree of regurgitation may be determined. The ascent is usually long and vertical, with a sharp summit, but this square or convex if obstruction also exists. The distension-raised, and the notch preceding it exaggerated, while unusual ry-waves are not uncommon. A loud murmur is often heard in ries. In course of time they are very prone to become the seat romatous degeneration, owing to the repeated strain upon them. principal morbid change developed in connection with the heart rtrophy with dilatation of the left ventricle, which tends to be-xtreme. This is at first usually in excess of what is required for isation, which accounts for the great distension of the arteries, also gives rise to symptoms indicative of arterial and capillary Degeneration of the hypertrophied heart is, however, liable n soon, for the following reasons:—The supply of blood to its rough the coronary arteries is interfered with, because this de-pon the aortic recoil, and this force is rendered inefficient owing ncompetency of the valves allowing the blood to return into the while at the same time the aorta and other large vessels become atous, and therefore deficient in elasticity. The mitral orifice liable to be involved, as in the case of obstruction, and serious ns will necessarily follow this event, as well as cardiac degenera-latter setting in in some cases with great rapidity.

RICUSPID REGURGITATION. ETIOLOGY.—Practically this condi-ither associated with dilatation of the right cavities, consequent ome obstruction in the lungs, especially from emphysema; or it mitral disease, being then partly due to disease of the valves tra pressure upon them.

OMICAL CHARACTERS.—The orifice may be simply dilated, the eing thus rendered incompetent, but being free from disease; or es. especially the fixed tongue, with the chordæ tendineæ, are ally contracted and deformed. I have now and then observed rinous deposit upon them, when there was scarcely any organic

CAL PHENOMENA.—*Immediate signs.* 1. It is stated that a thrill has been felt in the epigastrium, but this must be ex-exceptional. 2. The characteristic systolic murmur is more ly absent than present, and requires usually an experienced or to detect it. In exceptional instances, however, it is well-

ce upon the circulation.—The general venous system suffers and seriously from tricuspid regurgitation, and all the symp-ilting therefrom follow, this condition being a prominent cause dropsy. The abdominal circulation is affected very early, on of the deficiency of valves here. In addition, some important signs are originated, viz., distension and varicosity of the cer-s. especially of the right external jugular and sometimes of the r the chest; venous pulsation in the neck, and, according to some, in the hepatic veins; and filling of the external jugular vein from below, after it has been emptied by pressure. The pulmonary circulation is relieved, and thus pulmonary symptoms are often diminished.

Effects on the heart.—Tricuspid regurgitation tends to increase hypertrophy of the right ventricle, and to cause enlargement of the auricle. If considerable it may diminish murmurs on the left side of the heart.

VI. Tricuspid Obstruction is a mere curiosity, if it ever exists. It might possibly be the consequence of endocarditis during intra-uterine life; and its signs and effects would be similar to those of regurgitation, except that the murmur would be præsystolic.

VII. Pulmonary Disease.—A very few observations will suffice for the affections of the pulmonary orifice. They are extremely rare, especially regurgitation. In the great majority of cases obstruction is due to congenital constriction of the orifice, which may be extreme; sometimes the valves are much thickened, atheromatous and calcareous. A systolic thrill and murmur may be observed at the left base. The pulse is not affected, as it is in aortic disease. There are often signs of right hypertrophy and dilatation; followed by overloading of the systemic veins.

II. Enlargements of the Heart.

Enlargement of the heart may be due to:—1. Hypertrophy of its muscular walls. 2. Dilatation of its cavities. In most instances there is a combination of these conditions, though in very variable degrees, and the varieties met with are sufficiently indicated in the following classification:—1. Simple hypertrophy. 2. Eccentric hypertrophy, or hypertrophy with dilatation, the former being in excess. 3. Dilatation with hypertrophy, the dilatation being the more marked. 4. Dilatation with attenuation of the walls, or simple dilatation. A form has been described as concentric hypertrophy, in which the cavities are contracted, but in reality this appearance is merely due to post mortem contraction of the walls of a hypertrophied heart.

It will be convenient to consider hypertrophy and dilatation together, any special facts relating to either of them being indicated as occasion arises.

Etiology.—The numerous causes of cardiac enlargement may be ranged under certain heads.

1. *Direct obstruction, either in connection with the orifices of the heart or with the vessels, which interferes with the passage of the blood.* Cardiac obstruction is usually seated at the aortic or mitral orifice, very rarely at the pulmonary. The aorta may be obstructed from extensive atheroma or calcification, aneurism, congenital constriction, or external pressure by an aneurism or other tumour. In connection with the general circulation the conditions giving rise to cardiac enlargement are extensive atheroma and calcification of the arteries; changes in the arterioles and capillaries accompanying chronic renal disease; and alterations in the calibre of the small vessels associated with exophthalmic goitre. In the pulmonary circulation obstruction may arise from congenital constriction of, or external pressure upon the pulmonary artery; chronic pulmonary diseases, especially chronic bronchitis with

sema, extensive pleuritic adhesions with retracted side, and tial pneumonia ; or atheroma of the pulmonary vessels.

ruction tends more especially to lead to hypertrophy, but if it is t about suddenly, a primary dilatation ensues ; when the obstruc- gradual in its progress, the hypertrophy is often of the most pure

istension of the walls of the heart during diastole under increased e. This is a most important cause of cardiac enlargement, being exemplified by aortic and mitral regurgitation, and to a less by tricuspid regurgitation. In these conditions there are two s of blood entering the cavity into which regurgitation takes ften under excessive pressure. At first dilatation is produced, most cases hypertrophy is soon superadded, the relative propor epending upon various circumstances ; the heart may ultimately enormous dimensions.

onstrained action of the heart, in consequence of which the con- of this organ is impeded, and it has to work under physical disad- s. Displacement of the heart from any cause, but especially c effusion ; interference with its action from deformed thorax ; ricardial agglutination are the important causes of enlargement under this head, and they tend chiefly to develop hyper-

is probable that mere *excessive cardiac action*, such as is observed itual palpitation, will induce hypertrophy. Some authorities explain this by affirming that there is an obstacle in the arterial ion, owing to contraction of the muscular coat of the vessels, eads to compensatory hypertrophy.

has been stated that permanent enlargement may follow the on which frequently results from some *temporary loss of resisting n the walls of the heart*, such as is associated with softening in low myo-carditis accompanying peri- or endocarditis ; or nervous due to excessive smoking or venery and various other causes. ecovery a compensatory hypertrophy is said to be set up, and ill is inclined to believe that this may lead to a reduction of the ilar cavity to its original and normal dimensions.

have deemed it best to notice separately that important class of n which cardiac enlargement is the result of *violent effort, especially e arms*, such as is carried on in certain laborious occupations ermen, colliers, &c.), gymnastic exercises, rowing, or climbing ins. The enlargement is principally due to the obstruction to ulation which is caused by the muscles crossing the arteries, the also by their rigid condition opposing the passage of blood their own vessels ; and after a time to the aortic disease which iated. The excessive action of the heart which is excited from time must not, however, be overlooked as probably aiding in about the enlargement. Enlargement of the right cavities is ble to be developed in runners, swimmers, divers, and others their wind unduly from time to time.

plethoric state of the system resulting from over-eating, especially enized food, and abuse of alcohol, has been stated to cause phy of the heart.

8. Cases of hypertrophied heart now and then come under observation in which no cause can be detected, and then the hypertrophy is presumed to be *idiopathic* and *primary*.

With regard to dilatation it is necessary to mention further that this is more liable to follow and is more marked in those conditions which give rise to great internal pressure on the cardiac walls during diastole; when obstruction arises rapidly; and when the walls of the heart are deficient in resisting power from any cause, as after acute or long-continued chronic illness, or when they are the seat of congestion, serous infiltration, inflammation, or various degenerative changes, especially fatty and fibroid.

Before proceeding to the consideration of the morbid appearances and clinical phenomena associated with cardiac enlargements, it is needful to notice certain important circumstances which influence them, viz.:— 1. The nature of the enlargement, whether due to hypertrophy, dilatation, or both; and the relative degrees in which these are combined. 2. The part of the heart affected. 3. The state of the cardiac walls. 4. The condition of the valves and orifices. 5. The presence of pericardial adhesions.

ANATOMICAL CHARACTERS.—The important alterations produced in the heart from hypertrophy and dilatation may be stated as follows:— 1. *Increase in bulk*, this being in proportion to the dilatation. 2. *Increase in weight*, which is due to hypertrophy, and therefore in the ratio of this. The enlargement and excess in weight vary greatly in degree, the heart being sometimes three or four times heavier than usual, and enormously increased in dimensions. It is then called the *cor bovinum vel taurinum*. 3. *Change in shape.* In general dilated hypertrophy the heart tends to become more or less globular, the apex being rounded or obliterated. If the left cavities are alone involved, and especially merely hypertrophied, the heart is elongated and more conical, the apex of the left ventricle extending downwards some distance beyond the right. When the right side is solely affected, there is a tendency to roundness and increase in breadth, the right ventricle lying forwards, so as to overlap the left and to form the apex. 4. *Alteration in position and axis.* As a rule the heart is lowered, and its apex displaced to the left, while the right border becomes more horizontal, the last character being especially observed in enlargement of the right side, which may also cause increase in an upward direction. 5. *Changes in the thickness of the walls, and in the size and shape of the cavities.* There are generally obvious alterations in these respects, but they vary considerably according to both the absolute and relative amount of hypertrophy and dilatation. The walls of the left ventricle may be 1½ to 2 inches in thickness; those of the right from 1 to 1¼ inch. The septum is usually involved, and tends to bulge towards that cavity which is least implicated. It must be remembered that there may be considerable hypertrophy with little or no thickening of the walls, because it is accompanied with much dilatation. In simple dilatation the walls of an auricle may become so thin as to consist of scarcely anything but pericardium and endocardium, and to be almost transparent. 6. *Physical characters of the heart-tissue.* In hypertrophy, provided no degeneration has set in, the cardiac walls appear either of normal colour or of an unusually bright

ber, and arranged more closely together. Fatty degeneration
tly follows hypertrophy, and it has been supposed that the
-formed fibres are more liable to this change. The coronary
become enlarged, and some believe that the nerves and nerve-
are also increased in size; others think that there is only a
asia of the connective tissue associated with these. The valves
ome hypertrophied in the same ratio as the muscular tissue.

rding to the cause of the morbid changes, enlargement of the
ay be general; limited to the left, or less commonly to the right
one cavity, especially a ventricle; or even to particular portions
As a general statement it may be affirmed that the left side of
t is more liable to hypertrophy; the right to dilatation. The
are probably never solely hypertrophied, being always dilated as

TOMS. — It is for many reasons difficult to indicate precisely
mptoms are directly due to hypertrophy and dilatation, and
part of the subject it must suffice to state the main general

re hypertrophy, provided it is strictly compensatory and no
ay be unattended with any symptoms whatever.

many cases, however, the hypertrophy is excessive, and thus
e to sensations of the increased action, both in the heart and in
ries; as well as to signs of active congestion of the systemic cir-
, especially that of the brain, or of the pulmonary circulation, or
cording as the hypertrophy is left, right, or general; these symp-
eing aggravated by anything which excites the heart, such as a
ertion. The undue distention of the arteries resulting from
e hypertrophy ultimately leads to their degeneration, and it
y may cause rupture of the cerebral vessels with consequent
y. It is believed that the pulmonary vessels may undergo
ation from the same cause, and that they also may give way.

the hypertrophy is insufficient, or is associated with dilatation
neration, then the symptoms are more marked. In the first
n there is palpitation with dyspnœa especially after any exer-

sensations are often experienced over the cardiac region, which may amount to intense anginal pains. Palpitation, irregularity, or intermittency are either constantly present or are brought on by slight causes, especially by any exertion or flatulence. Dyspnœa is also persistent to a greater or less degree, being easily intensified, and often amounting to orthopnœa; while all the consequences of pulmonary congestion are very liable to arise. The symptoms indicative of general venous congestion are present to their fullest extent when there is much dilatation of the right cavities. It is important to notice that while in hypertrophy the urine is unaltered, in proportion to the dilatation it becomes more scanty and concentrated, and usually contains albumen, which may amount to one-eighth or one-sixth its bulk.

Physical Signs.—In the following description an attempt is made to indicate the chief variations which may be met with.

1. Bulging over the cardiac region is observed in proportion to the degree of hypertrophy; to its duration; and to the youth of the patient; its seat and extent depend upon those of the hypertrophy. The spaces may be widened, but are not protruded. Dilatation does not cause bulging.

2. The impulse is much altered. In hypertrophy it is usually displaced down and to the left, sometimes reaching to the seventh or eighth space, and three inches or more to the left of the nipple; somewhat increased in area, but well-defined and limited; forcible, in some instances being extremely powerful; slow, impulsive, heaving or pushing in a downward direction; and regular. Dilatation tends to enlarge the impulse transversely, especially towards the right, but does not lower it; it becomes extensive, diffused, and ill-defined; liable to change its place with different beats of the heart; more or less feeble, being sometimes seen when not felt, or neither perceptible to touch nor sight; of jerking or slapping quality, or occasionally almost undulatory; unequal in force and irregular in rhythm; or even intermittent; sometimes double, or with a diastolic impulse. It will be readily understood that according to the degree in which hypertrophy and dilatation are combined will the impulse partake of the characters of one or the other. Further, the part of the heart involved will influence it. When the right side is affected, the chief impulse lies behind and to the right of the sternum and ensiform cartilage, or in the epigastrium; and it appears superficial. Hypertrophy about the base of the heart may originate an impulse in this situation, and if either auricle is enlarged, auricular pulsation may be felt over the corresponding region. Valvular diseases and fatty degeneration frequently affect the impulse associated with enlarged heart.

3. Cardiac dulness. In all forms of enlargement this is necessarily increased, but it is important to notice in what directions the increase takes place, and the shape of the dulness. Hypertrophy generally enlarges it downwards and to the left, and causes it to assume a vertically-elongated form. Dilatation extends it transversely, especially towards the right, rendering it somewhat square or circular, but does not lower it. General hypertrophy with dilatation gives rise to the greatest enlargement, both laterally and downwards, the shape being more or less square. It is said that the dulness of hypertrophy is more

it being in excess. In some cases there can scarcely be said to al sound, but rather a sensation conveyed to the head through thoscope, and occasionally a sound as of knocking against the ralls is heard. At the base the first sound may be much clearer ore valvular. The second sound is often well accentuated at the o as to resemble a first sound. In dilatation the sounds tend to ile, but clear, short, sharp, and valvular. The first sound becomes towards the base, but the second may be well accentuated in ation. A peculiar sensation is described in simple dilatation, s communicated through the stethoscope, as of a diffused tumble heart against the chest-wall with rolling over, followed by a pause, ed to "the sudden halt of strikers on an anvil" (Richardson); a horse changing its feet while cantering" (Fothergill). Com- hypertrophy and dilatation cause the first sound to become ely loud, full, prolonged, and accentuated, so as to be heard tensively; if the valves are also hypertrophied, it may have a g quality. The sounds will be unusually plain towards the right if either side is particularly affected; and right hypertrophy nded with increased accentuation of the pulmonary second Reduplication of the sounds is common in enlargement of rt.

lurmurs occasionally result from enlargement of cavities, as explained. Hypertrophy with dilatation will intensify murmurs valvular diseases; and the latter will necessarily modify the above described.

n enlarged heart may cause displacement of neighbouring struc- The lungs, especially the left, may be pressed upon, dulness and respiration at the base being thus originated. The diaphragm, nd stomach may also be depressed.

ulse. In hypertrophy involving the left ventricle the larger are generally seen to throb more or less violently, and some-

2. In connection with general wasting from old age, starvation, low
phthisis, cancer, and other affections inducing marasmus. 3. From
sure upon the heart by pericardial agglutinations or effusion; or e
sive accumulation of fat. This cause acts partly by interfering with
supply of blood. 4. As the result of disease or obstruction of
coronary arteries, the heart being therefore imperfectly nourished,
the atrophy is then generally accompanied with degenerative chang

ANATOMICAL CHARACTERS.—Diminution in weight is the cha
istic feature of cardiac atrophy, and this may be reduced to 3½
even less. As a rule the heart is small, and its cavities are cont
the shape being normal. An eccentric form is described, howe
which there is dilatation as well as atrophy. The muscular
usually wanting in tone, and fatty degeneration is not uncommon.

SYMPTOMS.—Feebleness of the circulation is the only symptom
can be attributed directly to atrophy. When it follows pressure
the heart or interference with its supply of blood, severe sympto
often present, such as palpitation, dyspnœa, and general venous
gestion; but these are not the immediate consequences of the
The *physical signs* are:—1. A feeble impulse, which may be
2. Diminished area of dulness. 3. Weak or sometimes almost
sounds. 5. Pulse small, feeble, but regular.

IV. FATTY DISEASE OF THE HEART.

There are two distinct pathological processes in connection with
heart to which the term "fatty disease" is applied, each requiri
separate consideration.

1. FATTY INFILTRATION.

ETIOLOGY.—This condition is observed:—1. As a part of general obesity, especially in elderly persons. 2. In individuals who have suffered from cancer, phthisis, and other wasting affections. 3. In connection with chronic alcoholism.

ANATOMICAL CHARACTERS.—There is an infiltration of the connective-tissue cells around and in the substance of the heart with fat, leading to a kind of "fatty hypertrophy." This commences under the pericardium, but it penetrates inwards between the muscular fibres, causing their degeneration and absorption, so that finally the affected portions of the cardiac walls may be almost or entirely composed of adipose tissue. The ventricles are chiefly affected, especially the right, and there is a particular tendency to the accumulation of fat along the sulci, and about the base and apex. The tissue is necessarily pale, soft, flabby, and lacerable.

SYMPTOMS.—Fatty infiltration may be suspected, but cannot often be positively made out. If considerable in amount it is liable to be accompanied with uncomfortable sensations in the cardiac region; palpitation on exertion; shortness of breath; and a weak and languid circulation, leading to incapacity for any effort, chilliness of the extremities, and a tendency to giddiness or faintness. *Physical examina-*

from mal-nutrition, owing to some interference with the supply
d through the coronary arteries. This may arise from atheroma
ification of the vessels themselves; embolic obstruction; external
ssion, especially by pericardial thickening; or impairment of
ce of the aortic recoil from any cause. A hypertrophied or
heart is very liable to degenerate, chiefly in consequence of
ate blood-supply. 2. This disease is sometimes a part of a
tendency to fatty changes, these being observed at the same
the kidneys, lungs, vessels, cells of the cornea, and other struc-
They may be set up without any evident cause; or in connec-
h senile decay, alcoholism, gout, and lowering diseases, such as
or cancer. Most authorities regard them as being the result of
nhealthy condition of the blood; but it has been suggested that
hic nerves are at fault. Some are of opinion that the heart
er structures may become fatty in consequence of renal disease,
enders the blood impure. 3. More or less fatty degeneration is
ed with fatty infiltration, and it may follow myo-carditis. 4. The
s been found to have undergone fatty degeneration in cases of
g by phosphorus, phosphoric and several other acids. 5. It
n suggested that disease of the cardiac ganglia and nerves may
fatty degeneration.
sposing causes.—The most important of these are age, the disease
ry uncommon in the young, and increasing in frequency after
life to about the sixty-third year (Watson), after which it gra-
ecomes less common; the male sex; sedentary and indolent
especially when combined with over-eating and drinking, fatty
ation being hence said to be more common among the higher
and in those whose occupations lead to the above habits, such
cans or butlers; and the presence of gout or Bright's disease.
general obesity nor the opposite condition seems to have any
e.

mere "wet brown paper." There may be a greasy feel, oil being yielded on pressure, or to the knife, blotting-paper, or ether.

The microscopic changes are characteristic, and may be observed before there are any alterations evident to the naked eye. At first the striæ of the muscular fibres are merely rendered indistinct by fat-granules and oil-globules, being brought out again by ether. Gradually they become more and more obscured, until finally they disappear altogether, the fibres being made up entirely of fat. Some are of opinion that fat is formed between as well as within the fibres.

SYMPTOMS.—Undoubtedly fatty degeneration may exist without there being any clinical indications of this condition, or only such as are doubtful. Sudden death has occurred from this disease, when there had been no previous suspicion of anything being wrong. Cases, however, come under observation not uncommonly in which the diagnosis may be made with tolerable positiveness. As a rule the progress of the disease is very gradual and insidious. Most of the symptoms depend upon the feeble action of the heart.

Unpleasant sensations are frequently complained of over the cardiac region, and anginal attacks are very liable to arise. Palpitation is often felt during the progress of the degeneration, not, however, directly due to the diseased fibres, but to those which are unaffected, these being insufficient for carrying on the circulation. The principal disturbances of the cardiac action observed are infrequency, the beats being reduced to fifty, forty, thirty, twenty-five, or even less in a minute; feebleness; irregularity; and intermittency. Any exertion tends to increase the frequency, and to render the action very irregular.

The appearance of the patient may afford signs of the disease. There is not unfrequently a sallow earthy tint, combined with anæmia, or with lividity about the lips, and enlarged capillaries on the cheeks, both of which appearances I have seen well marked. Fothergill describes the skin as sometimes resembling discoloured parchment, having a greasy feel and presenting changes in the epidermis. The tissues are generally flabby and wanting in tone. There are frequently evidences of degeneration in the vessels and other structures. Among these the *arcus senilis* has been considered of material diagnostic importance, especially when it is yellow, ill-defined, and passes into a cloudy cornea; but this is very questionable.

The patient feels weak and languid; deficient in vitality; subject to chilliness; and incapacitated for any exertion, which brings on shortness of breath, faintness, or actual syncope. Involuntary sighing is sometimes heard, and also the disturbance of breathing described by Cheyne.

Owing to the inadequate supply of blood to the nervous centres important symptoms arise. The chief of these are habitual depression of spirits; irritability and moroseness; curious sensations in the head; disturbances of vision; feebleness of intellect, with failure of memory and inaptitude for thought; tremulousness and an unsteady gait; a tendency to sudden attacks of giddiness, which make the patient cling to the nearest object; restless and disturbed sleep attended with startings; and unusual sensations in the limbs. Sudden cerebral anæmia is very liable to occur, inducing syncope; apoplectiform or epileptin attacks; or a combination of these conditions, which, however, soon recovered from as a rule, and do not leave any permanent ill ects behind.

The digestive organs are generally out of order. A sensation of ing in the epigastrium is often complained of. Sexual inclination d power are notably deficient.

It must be borne in mind that fatty degeneration may set in in con- ction wtth a hypertrophied or dilated heart or with valvular disease, d it will then modify the symptoms as well as the physical signs companying these conditions, especially adding to the difficulty in rying on the circulation.

PHYSICAL SIGNS.—The only positive signs of fatty heart are these:— The impulse is feeble or absent, but if perceptible it is well-defined. The sounds are weak, especially the first, which may be almost in- ible, especially at the base, where it is weaker than at the apex. he second sound may be fairly accentuated. 3. The pulse is very ible, small, and compressible; often infrequent, there being sometimes t one pulsation to two ventricular contractions; while it tends to be y irregular, and may become hurried paroxysmally, so as to be almost countable from its frequency and irregularity (Walshe).

COURSE AND TERMINATIONS.—Patients suffering from fatty heart may on for years, but death is to be feared at any moment if the disease advanced. The fatal termination may occur quite suddenly from cope, usually after some effort; rupture of the heart, either sudden gradual; cerebral anæmia; or gradually from asthenia, which may attended with dropsy, but this symptom is often absent from t to last, even in extreme cases, and it is a question whether fatty ease alone can give rise to it.

DEGENERATIONS AND NEW FORMATIONS IN THE WALLS OF THE HEART.

In addition to the fatty degeneration just described, it is requisite to ntion the following:—1. Softening of the tissue of the heart in con- tion with low febrile conditions, especially typhus, typhoid, small- x, scarlatina, and septicæmia from any cause. A form of simple tening has also been described, chronic in its course. 2. Fibroid ltration or degeneration, or so-called cirrhosis. This is localised, ecially in the musculi papillares, but it may form scar-like patches in walls. In some cases it results from inflammation; but in others it ms to be a gradual change, from proliferation of an imperfect fibroid ue; or some believe there is an infiltration of material between the scular fibres. 3. Calcification. 4. Syphilitic growths. 5. Albuminoid eneration. 6. Cancer, which is extremely rare, being usually medul- and nodular. 7. Tubercle, also very rare. 8. Parasitic formations, , the cysticercus cellulosus, and the echinococcus.

VI. CARDIAC ANEURISM.

y cardiac aneurism is meant a localised dilatation of the walls of the t. It may involve the entire thickness, or the endocardium and contiguous muscular strata may be destroyed. The size and form of the aneurism vary much, but there are the two types of general and equable dilatation of a portion of the parietes; and the sacculated variety, the latter opening into the heart by a wide or narrow orifice. More or less stratified fibrin or coagulated blood is usually found in the sac, and it may be thus completely obliterated and cured. It is the left ventricle which is almost invariably affected, and more than one aneurism may be present.

Cardiac aneurism is almost always the consequence of some previous structural change in the ventricular walls, especially fatty or fibroid degeneration; inflammation; softening from any cause; rarely ulceration or rupture of the endocardium; or hæmorrhage into the walls. As a rule it is formed gradually, but may be developed suddenly from violent strain. Fibroid and other degenerative changes are likely to be increased, or to be subsequently set up at the seat of aneurism.

There are no reliable symptoms or signs of aneurism of the heart. Sometimes a localised pulsating prominence is observed, with a single or double murmur. Hypertrophy and dilatation are developed in time. Death may take place suddenly from rupture of the aneurism.

VII. RUPTURE OF THE HEART.

ETIOLOGY.—This rare lesion may be considered here, as the rupture is generally the result of some structural change in the cardiac walls, and probably even in traumatic cases they are never quite healthy. The more important morbid conditions which have been observed are fatty disease, especially degeneration; great dilatation; cardiac aneurism; abscess or gangrene; ulcerative or other destruction of the endocardium; hæmorrhage into the walls; calcification; and parasitic formations. Rupture may occur in connection with aortic aneurism or coarctation, but then the heart is probably always diseased as well. It is almost invariably induced by some exciting cause, and is much more frequent in males and old persons.

ANATOMICAL CHARACTERS.—The size, shape, and other characters of the rupture vary considerably. On the whole it is much more frequent in the left ventricle, but traumatic rupture is more common on the right side. The direction of the laceration is generally parallel to the chief fibres of the heart.

SYMPTOMS.—These vary according to the mode in which the rupture takes place, and its dimensions. Death may be instantaneous, or very rapid after sudden insensibility preceded by a shriek. If this does not happen, the important symptoms are sudden extreme pain in the cardiac region; a sense of great oppression and dyspnœa; signs of intense shock and collapse; and interference with the cardiac action. Patients occasionally rally, and there may be repeated attacks, supposed to indicate rupture of successive layers of the heart's fibres. It is even stated that recovery may take place.

CHAPTER XXIII.

AL DIAGNOSIS, PROGNOSIS, AND TREATMENT OF CHRONIC CARDIAC AFFECTIONS.

I. DIAGNOSIS.

g a diagnosis with regard to affections of the heart, it is necessary ine :—1. Whether there is any actual organic mischief, or merely l disturbance, which gives rise to symptoms associated with this 2. The nature, exact seat, and extent of any organic disease the main conditions to be borne in mind being—*a*, different valeases; *b*, alterations in the size or capacity of the heart; *c*, changes ls ; *d*, interference with its supply of blood ; *e*, pericardial effusion ion. It must be remembered that these lesions are often variously d, and an endeavour should be made to determine the precise he structures in every particular mentioned. 3. The pathological any existing lesion, if this can be discovered.

rate account of the diagnosis of each disease would involve ary repetition, and it will be sufficient to indicate the data on is should be founded, these being :—1. The previous history tient, special inquiry being made with regard to acute rheumaviolent exertion. It may also be of some help to note whether any family predisposition to cardiac disease. 2. The age, sex, ral condition, particularly observing whether there are signs of tion. 3. The symptoms present, especially noting if the circudisturbed in any way and the phenomena resulting therefrom. hysical signs detected. Physical examination is the only posireliable means of diagnosis, and daily experience enforces the ce of investigating the state of the heart in any case which nder observation for the first time, and especially when g for life-insurance. The points to be attended to in this ion are :—(i.) Whether there is any change in the shape or e chest over the cardiac region. (ii.) The characters of the in every particular. (iii.) Whether any thrill or pericardial can be felt. (iv.) The position, form, direction, and extent of iac dulness. (v.) The characters of the heart-sounds, these npared over different parts of this organ. (vi.) Whether any perir endocardial murmur can be detected, with the characters of mur. It is also requisite to examine carefully the arteries and king use of the sphygmograph when necessary in connection former, and observing whether they present evidences of ion.

nportant to draw attention to the following facts :—1. The be displaced by extrinsic conditions, thus presenting abnormal signs when it is not itself affected ; while signs of organic ay be modified by the state of contiguous structures. 2. Murbelong to the inorganic class ; or may be merely due to of the endocardium, which is unattended with any danger. lging and dulness indicative of pericardial effusion or cardiac enlargement may be simulated by excessive temporary distension of the right cavities of the heart; aneurism of the aorta; tumour, abscess, or accumulation of fat in the mediastinum; localised pleuritic effusion; consolidation or retraction of the anterior edges of the lungs, especially the left. 4. Organic disease, even of a serious nature, is not unfrequently unattended with any symptoms whatever; and there may be no distinctive physical signs, particularly in the early stage of degeneration. 5. Severe cardiac symptoms may be complained of, and there may even be marked objective disturbance of the heart's action, amounting to irregularity or intermittency, in connection with mere functional disorder. Much stress has been laid on certain points in making out whether local cardiac symptoms are due to organic mischief or not, viz., that mere functional disturbance is not increased by effort; is inconstant; and is usually brought on by some obvious exciting cause. My own experience would lead me to avoid placing any implicit reliance on such distinctions, except that grave disorder following slight exertion may be an useful sign indicative of degeneration.

II. PROGNOSIS.

Any organic affection of the heart should be regarded as serious, but numerous circumstances influence the prognosis, and every case has to be considered in several aspects before a satisfactory opinion on this matter can be given. It must be premised that great care should be exercised against mistaking mere functional disorder for organic disease and *vice versâ*, which might lead to a wrong prognosis in either direction, and it is therefore highly improper to attempt to found any conclusion on mere subjective symptoms.

The questions which have to be considered in any particular case of heart-disease are mainly these:—1. Whether there is any danger of sudden death? 2. What are the events likely to arise in the progres of the case, and the dangers to be feared? 3. Its probable duration 4. Whether a cure is possible? In the following remarks an endeavou will be made to indicate the chief matters to be attended to in order t arrive at a conclusion on these questions; and to state the principal fact which experience has established.

1. The prognosis must necessarily be guided by the nature, seat, an extent of the disease or diseases present, the knowledge of these facts bein of course founded on a satisfactory physical examination. Instances a met with occasionally in which a murmur arises from mere roughness the endocardium; in such cases there is not much danger, exce that the mischief might spread to the orifices and valves or their appe dages. Any organic affection in connection with either orifice, induci obstruction or regurgitation, is decidedly serious, but the dangers a very different at the different orifices, and depend upon their preci conditions. In estimating the probable evils, the effects of the vario lesions upon the circulation must be borne in mind, as well as t secondary changes which they are likely to originate in the heart. Wi regard to sudden death, aortic regurgitation is the only form of valvul disease in which this event may be anticipated with any probability, b it is said to have occurred in exceptional cases of mitral regurgitatio

a hypertrophied heart, this is certainly not what ou and it is more than doubtful whether it can be ef such means towards this end as repeated local bl severe purgation, and large doses of iodide of pota to be condemned, and the great object should ra the nutrition of the heart as much as possible, becoming dilated or undergoing degeneration. 1 means of influencing dilatation, except by improvin of the heart by food, tonics, and digitalis. It is qu nutrition of a fatty heart may be improved in som diet, tonics, and cod liver oil.

6. Various symptoms are liable to arise in the heart-disease, demanding measures for their relief. diately connected with the heart are pain and other palpitation; angina pectoris; and faintness or sync sations are often much relieved by wearing a belladon patients are never comfortable except when they have times belladonna liniment is very useful. The tre symptoms has been already pointed out. With r attended with dyspnœa, this is in some instances subcutaneous injection of a very small quantity (gr. which is supposed to relieve spasm of the arteriol the palpitation (Fothergill). Aconite in minute mended strongly by Ringer and others. Pulmonar treated by the usual remedies, but they are often digitalis. Needless cough should decidedly be subd quently necessary to promote expectoration. Card many cases be relieved by digitalis, or may require antispasmodics. Any obvious cause giving rise to as flatulence, should be at once got rid of, and it is by enabling the patient to sit up in bed, thus remov

seizures increase the danger of a case very materially. When t general venous circulation becomes much interfered with and dr sets in, the duration is not likely to be very prolonged, but it is imp sible to make any definite statement on this matter, as patients o linger on for a considerable time, and may even improve remark under appropriate treatment. It is important to notice further t acute pulmonary complications may arise and cause very severe sym toms, also much increasing the dropsy, so that the case appears to approaching a speedy termination; but on the subsidence of these com plications great improvement may take place, the patient again going for some time and sometimes even feeling better than before.

3. The cause of the mischief may influence the prognosis, as well whether such cause is capable of being removed. For instance, im provement in valvular disease can only be hoped for when it resu from acute inflammation; if induced by chronic and degenerativ changes, matters always tend to become worse. As has been pre-viously stated, some regard a certain degree of hypertrophy or even of dilatation as capable of being completely cured, if the cause can be removed.

4. The state of other organs and structures, especially of the lungs, kidneys, and arteries will considerably modify the prognosis in any given case, and hence their condition ought to be carefully investigated. If the vessels are much diseased the muscular tissue of the heart is very likely to undergo speedy degeneration.

5. Among general matters affecting the prognosis are the age of the patient; the family history, as indicating a tendency to death from heart-disease at any particular time; the social position and habits of the patient. It is only in young persons that curative changes can be at all expected. Those who are so circumstanced that they are able to live quietly, without either the anxiety or the labour arising from having to provide day by day for themselves and their families, and who can procure a suitable diet, have a much better chance of length of life than those not so fortunately situated. Laborious occupations are especially injurious. Continuance in injurious habits, such as intemperance or debauchery, will necessarily render the prognosis more unfavourable.

III. Treatment.

Very seldom can any hope be entertained of curing a chronic cardiac affection, but undoubtedly much may be done in the way of prolonging life; averting further mischief in the heart; warding off unpleasant or dangerous symptoms; and relieving such symptoms when they arise. After any acute affection involving the heart the patient should be kept strictly under observation until this organ has been restored to as normal a condition as possible; while any chronic case ought to be kept constantly under medical supervision. Different forms of heart disease require particular modifications in their management; but it will suffice here to point out the main principles which apply to all varieties more or less and as occasion requires to call attention to any special treatment which needs comment.

1. General hygienic management is always of essential importance

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ETIOLOGY.—The *pathological causes* of cardiac m
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position of the arteries, the aorta coming from the
the pulmonary artery from the left. 4. Both vessels

are longer; the blood is driven more forcibly and in
into the aorta; the aortic recoil is promoted; and thu
the cardiac walls improved (Fothergill).

There are considerable differences of opinion as to t
digitalis is indicated, and as to its mode of administrati
ing remarks may serve to convey the main practical fac
the use of this drug, partly founded on the statements
on personal clinical observation.

(i.) In all cases in which digitalis is given its effects
fully watched, especially as regards the cardiac action;
pulse; the urine; and any dropsy which may be pre
action of the heart is rapid, irregular, ineffective, or
pulse being at the same time weak, the good results o
talis are seen in that it calms the heart and makes this o
and more vigorously, often relieving unpleasant local sen
being at the same time improved, becoming less frequen
and more regular. Intermittency has been conside
contra-indicating digitalis, but though more than usu
quired under such circumstances, yet it may be give
with excellent results, and Fothergill is of opinion t
indicates a necessity for increasing the dose. If it a
irregularity or intermittency, with much feebleness o
should be discontinued. The urine is often much ir
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heart being increased, and through this the arterial
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dangerous symptoms; and relieving such symptoms

Several other remedies influence the heart, viz., aconite, bel (both of which are very valuable in calming this organ whe excitedly and violently), hydrocyanic acid, veratria, caffeine, so and squill. Some of these require to be given cautiously, as th powerful agents.

5. Important questions suggest themselves, as to whether any are known capable of restoring the heart to its normal conditio in a state of disease; and whether it is desirable to use such As regards valvular diseases, it is useless to attempt to influenc by any therapeutic measures. With respect to the diminution in a hypertrophied heart, this is certainly not what ought to be and it is more than doubtful whether it can be effected in the such means towards this end as repeated local bleedings, low severe purgation, and large doses of iodide of potassium, are de to be condemned, and the great object should rather be to the nutrition of the heart as much as possible, and prevent i becoming dilated or undergoing degeneration. There are no means of influencing dilatation, except by improving the tone and of the heart by food, tonics, and digitalis. It is quite possible th nutrition of a fatty heart may be improved in some instances by diet, tonics, and cod liver oil.

6. Various symptoms are liable to arise in the course of a c heart-disease, demanding measures for their relief. Those more i diately connected with the heart are pain and other unusual sens palpitation; angina pectoris; and faintness or syncope. Abnorma sations are often much relieved by wearing a belladonna plaster, and patients are never comfortable except when they have one applied. Some times belladonna liniment is very useful. The treatment of the other symptoms has been already pointed out. With regard to palpitation attended with dyspnœa, this is in some instances much quieted by the subcutaneous injection of a very small quantity (gr. $\frac{1}{12}$ to $\frac{1}{6}$) of morphia, which is supposed to relieve spasm of the arterioles, this giving rise t the palpitation (Fothergill). Aconite in minute doses is also recom mended strongly by Ringer and others. Pulmonary symptoms must b treated by the usual remedies, but they are often greatly relieved b digitalis. Needless cough should decidedly be subdued, though it is fre quently necessary to promote expectoration. Cardiac dyspnœa may i many cases be relieved by digitalis, or may require various sedatives an antispasmodics. Any obvious cause giving rise to this symptom, suc as flatulence, should be at once got rid of, and it is generally diminishe by enabling the patient to sit up in bed, thus removing any pressure o the diaphragm from below. Hæmoptysis occurring in heart-diseas should not be rashly stopped, provided there is not sufficient loss (blood to injure the patient, as it may afford considerable relief.

Local remedies are often serviceable in the treatment of heart an lung symptoms, such as dry-cupping, hot or turpentine fomentation and sinapisms. Some recommend irritation along the course of th vagus nerve by means of sinapisms or gentle galvanism. In cas where the symptoms are severe, and there is evidence that the rig cavities of the heart are greatly over-distended, removal of blood ma prove decidedly serviceable for the time, either by venesection, loc

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CHAPTER XXIV.

MALFORMATIONS OF THE HEART AND GREA VESSELS—CYANOSIS—BLUE DISEASE.

THE term *cyanosis* merely indicates a certain appearance present
patient, which is especially observed in connection with malforma
the heart and great vessels, but is often associated to a greate
degree with other affections which obstruct the circulation and
with the due aëration of the blood.

ETIOLOGY.—The *pathological causes* of cardiac malformation
the great majority of cases either arrested development, or end
or myo-carditis occurring during intra-uterine existence, which
more common on the right side, especially in connection with
monary orifice. Possibly some forms may in very exceptional
be acquired after birth, in consequence of the rupture of a septu

ANATOMICAL CHARACTERS.—The following are the chief
conditions met with in the heart and great vessels which com
the class of *congenital malformations*, excluding some which are
of anatomical interest and do not give rise to any ill effects:—

I. CARDIAC. 1. Patent foramen ovale, or even complete ab
the auricular septum. 2. Perforation or incomplete developme
ventricular septum. 3. Owing to the above-mentioned conditio
may be but one auricle or ventricle; or sometimes an auricle
tricle are thrown into one; or there may even be scarcely any se
between any of the cavities. 4. Extreme smallness of the ri
tricle, either from the septum lying too much in this direction,
cicatricial thickening and stricture. This condition is ver
observed on the left side. 5. Constrictive disease of the t
orifice or contraction of the valves, leading to obstruction or r
tion; the same conditions are said to be met with, but only e
exceptionally, in the mitral orifice.

II. VASCULAR. 1. Constriction or incomplete developmen
pulmonary artery. In an interesting case which came under m
only the right branch existed, which was quite pervious, but th
were extensively diseased and calcareous. the left lung being co
collapsed and disorganised. 2. Constriction of the aorta. 3
position of the arteries, the aorta coming from the right ventr
the pulmonary artery from the left. 4. Both vessels may sprin
entirely or partially from the same ventricle, owing to displac
imperfection of the septum. 5. Occasionally there is but on
trunk, which comes from a single ventricle and then divides i
6. The ductus arteriosus is often pervious.

Some of these conditions are met with together, being in
necessary consequences of each other. Thus the most comm
formation observed is constriction of the pulmonary orifice,
open foramen ovale and a pervious ductus arteriosus, throug
the blood passes from the aorta into the pulmonary artery,
it also reaching the lungs through enlarged bronchial arteries.

and it is more than doubtful whether it can be ef
such means towards this end as repeated local bl
severe purgation, and large doses of iodide of pota
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the diaphragm from below. Hæmoptysis occurri

CHAPTER XXV.

DISEASES OF THE ARTERIES.

1. **Acute arteritis** is chiefly observed in connection with the aorta (aortitis), and probably it occurs in the course of blood-diseases more frequently than is generally recognised. It is characterised anatomically by injection of the vasa vasorum; thickening and softening of the coats of the artery; cloudiness and loss of polish of the inner surface, which becomes rough from fibrinous deposit.

Symptoms.—The symptoms which have been described in connection with aortitis are pain over the vessel, sometimes extreme, accompanied with much tenderness or superficial hyperæsthesia; a sense of heat and throbbing; severe constitutional disturbance and restlessness; sometimes a tendency to syncope; and dread of death. The *physical signs* are objective pulsation, with occasionally a thrill and murmur synchronous with the cardiac systole. In the smaller arteries inflammation might lead to complete plugging; but a clot may be the cause of inflammation.

2. **Chronic arteritis** is an important morbid process, and is now generally looked upon as originating the condition known as *atheroma*, this being preceded by a parenchymatous inflammation affecting the inner coat—*endarteritis deformans.*

Etiology.—The chief causes of chronic arteritis and consequent atheroma are:—1. Local injury from distension of, and strain upon, an artery, it being thus frequently due to hypertrophy of the heart. 2. Constitutional diseases, viz., gout, rheumatism, syphilis. 3. Abuse of alcohol. 4. Senile degeneration.

Anatomical Characters.—In the first instance the deeper layers of the inner arterial coat become infiltrated with new cells, softened, relaxed, and thickened. The cells are probably mainly derived from proliferation. As the result of this process thickened patches or more extensive tracts are observed over the inner surface of the artery, and two forms are described, supposed by some to be merely stages of the same process, viz., those which are soft, jelly-like, moist, and pale-reddish; and more firm, semi-cartilaginous or horny, raised patches, translucent, but more opaque in the deeper layers, and compared in appearance to boiled white of egg (Niemeyer). The superficial portion of the coat is unaffected, and can be stripped off. More or less rapidly fatty degeneration sets in, this beginning in the soft form chiefly in the superficial layers; in the cartilaginous variety in the deeper layers. In some cases degeneration takes place very speedily, owing to the abundance of cells, and a yellowish, soft, pultaceous substance is formed, like a greasy paste, this giving rise to a sort of pseudo-abscess or *atheromatous pustule*, which may ultimately burst into the artery; at first merely a small hole is formed in the inner coat, through which the soft contents escape and are carried away by the blood, but finally an *atheromatous ulcer* is formed, varying in size and depth, sometimes extending down to or even involving the middle coat. The softened

CHAPTER X

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VESSELS—CYANOSIS—

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which leads to hypertrophy of the left ventricle, this, however, tending to be speedily followed by degeneration. The circulation in the different organs is impeded, and among the most frequent symptoms resulting therefrom are those indicating disturbance of the cerebral circulation, especially giddiness and disorders of the special senses. Owing to the impairment of nutrition, structures are very liable to undergo degeneration and to become inflamed from slight causes. 2. When the vessels are roughened on their inner surface, fibrin is often deposited from the blood, which may ultimately cause their complete obstruction. As a consequence softening or death of a part may ensue, as is well seen in chronic softening of the brain and dry gangrene of the lower extremities. 3. A portion of an artery, especially after the formation of an atheromatous ulcer, is very prone to yield gradually, an aneurism being thus originated. 4. The affected vessels become brittle, particularly when calcified, and thus they are more easily ruptured, giving rise to cerebral apoplexy most commonly. 4. Fragments of the degenerate structures or of fibrinous deposits may be detached, carried away by the blood-current, and lodged in some smaller vessels as emboli. 6. Physical examination of the arteries reveals that they are visible, tortuous, and locomotive, and that they feel more or less hard, full, incompressible, cord-like or rigid. A sphygmographic tracing is characterised by the large dimensions of the curves; the approximation of the secondary waves to the summit; and the great size of the first secondary wave as compared with the aortic, the latter being much diminished.

When the arch of the aorta is extensively diseased, especially calcified, a jerking impulse may be observed above the sternum, and occasionally a thrill; while a rough systolic murmur may also be heard along the course of the vessel, or a cardiac basic murmur is intensified in this direction. The artery is often somewhat dilated at the same time, and this will increase the signs mentioned.

Diagnosis.—Degeneration of arteries should be always looked for in persons at all advanced in years, and it should be kept in mind as a probable cause of many symptoms of which they complain. Examination of the vessels is the only satisfactory means of diagnosis, and if the general arteries are affected, probably the aorta will be in the same condition. Some attach considerable importance to the sphygmographic tracing as revealing an early stage of degeneration.

Prognosis.—This merely involves a knowledge of the dangers which accompany degeneration, so that they may be guarded against. Many live to a good old age with the vessels much diseased, but at any moment there is a liability to dangerous lesions. The earlier the degeneration comes on the more serious is the prognosis.

Treatment.—All that can be done is to avoid everything which is likely to throw a strain upon the vessels; and to maintain the nutritive activity of the system as much as possible by diet, tonics, and cod-liver oil, the last being often decidedly useful. Any constitutional diathesis must be attended to, and all injurious habits checked.

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essels affected, as well as the extent over which the changes are , vary widely, and different stages are usually seen in the same hese changes are most marked in those parts of the vessels e subject to the greatest strain, especially the ascending and e portions of the arch of the aorta, and around the openings es which come off laterally, such as the intercostals. As a rule a is more advanced in the aorta than in the arteries generally.

ards inflammation of the other coats of arteries, the external ometimes involved by extension from neighbouring structures, y chronically, and this leads to thickening and induration. ldle coat is occasionally specially involved, and a small abscess le may form in it.

TTY DEGENERATION.—Fatty degeneration of arteries is an distinct process from that constituting atheroma. It begins genethe superficial part of the inner coat, but may extend into the coat or implicate this originally. The epithelial and connectivells of the inner coat are directly changed, becoming more or d with fat-granules, but in the middle coat the muscular fibres degeneration. The usual appearances are those of small, l, irregular, opaque, yellowish-white patches, quite superficial, y slighly projecting, and being easily removed, leaving normal derneath. As the deeper layers become involved the patches nore opaque and irregular, and are less easily stripped off. In of time complete destruction and softening may take place, but fat-granules remaining, which are carried away by the eaving irregular superficial erosions. Finally calcification may p. The capillaries are also liable to become the seat of this

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THORACIC ANEURISMS.

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re for a full consideration of the subject reference must be made
gical works. In this article it is only intended to allude to the
practical facts connected with aneurisms within the chest, espe-
aortic.

OLOGY.—Aneurism almost always results primarily from some
d change in the walls of an artery, especially chronic endarteritis
e atheromatous changes connected therewith, but also sometimes
fatty degeneration or simple atrophy. Its determining cause is
lly some more or less violent exertion, which throws a sudden or
nt strain upon the weak portion of the vessel, and may even lead
upture of part of its coats.

urism is much more common among males, especially those
occupation entails violent efforts; and about the middle period
. It is comparatively extremely frequent in the army; and this
een attributed to the combined effects of great exertion, tight
g, which compresses the neck and chest and obstructs the circu-
and heavy accoutrements. The diseases which predispose to
s in the vessels, such as syphilis, gout, and rheumatism, may be
ered as *predisposing causes* of aneurism, especially syphilis. It
en stated to be occasionally hereditary, but this is probably only
regards the degeneration of the vessels.

TOMICAL CHARACTERS.—The following varieties of aortic aneu-
are met with:—1. There may be a *general dilatation* involving
ole circumference, and either cylindrical, fusiform, or very rarely
r in shape. 2. *Sacculated aneurism* is the most important, in
there is a lateral bulging or sacculation of a portion of the cir
ence, the coats being either entire—*simple* or *true aneurism*; or
r less of the inner and middle coats being destroyed—*compound*
aneurism. Sometimes all the coats give way, and the aneurism
nded only by surrounding structures—*diffuse aneurism*. 3. In
ely exceptional cases a *dissecting* aneurism is observed. The
ing portion of the arch is most frequently affected, especially on
vex side, where the aorta is most exposed to strain; an aneurism
ist, however, on any part, even between the pillars of the dia-
. Great variety is presented as to size, exact shape, contents,
er characters.

PTOMS.—The symptoms of aortic aneurism are far from uniform,
hiefly due to pressure on surrounding structures (as described in
16–417), and therefore influenced by its situation, size, form, rapi-
formation, and direction of growth; being also liable to alter during
ress. The symptoms are by no means in proportion to the
l physical evidences of aneurism; indeed the reverse is often
cause the more an aneurism tends in an inward direction the
vere are the symptoms likely to be, and they may be extremely
ted when it is impossible to detect any enlargement by physical
tion. In some cases there are no symptoms or signs from first

Abnormal local sensations are usually present, such as pain,
in characters and intensity, heat, fulness and weight, or

which leads to hypertrophy of the left ventricle, this, however, tending to be speedily followed by degeneration. The circulation in the different organs is impeded, and among the most frequent symptoms resulting therefrom are those indicating disturbance of the cerebral circulation, especially giddiness and disorders of the special senses. Owing to the impairment of nutrition, structures are very liable to undergo degeneration and to become inflamed from slight causes. 2. When the vessels are roughened on their inner surface, fibrin is often deposited from the blood, which may ultimately cause their complete obstruction. As a consequence softening or death of a part may ensue, as is well seen in chronic softening of the brain and dry gangrene of the lower extremities. 3. A portion of an artery, especially after the formation of an atheromatous ulcer, is very prone to yield gradually, an aneurism being thus originated. 4. The affected vessels become brittle, particularly when calcified, and thus they are more easily ruptured, giving rise to cerebral apoplexy most commonly. 4. Fragments of the degenerate structures or of fibrinous deposits may be detached, carried away by the blood-current, and lodged in some smaller vessels as emboli. 6. Physical examination of the arteries reveals that they are visible, tortuous, and locomotive, and that they feel more or less hard, full, incompressible, cord-like or rigid. A sphygmographic tracing is characterised by the large dimensions of the curves; the approximation of the secondary waves to the summit; and the great size of the first secondary wave as compared with the aortic, the latter being much diminished.

When the arch of the aorta is extensively diseased, especially calcified, a jerking impulse may be observed above the sternum, and occasionally a thrill; while a rough systolic murmur may also be heard along the course of the vessel, or a cardiac basic murmur is intensified in this direction. The artery is often somewhat dilated at the same time, and this will increase the signs mentioned.

DIAGNOSIS.—Degeneration of arteries should be always looked for in persons at all advanced in years, and it should be kept in mind as a probable cause of many symptoms of which they complain. Examination of the vessels is the only satisfactory means of diagnosis, and if the general arteries are affected, probably the aorta will be in the same condition. Some attach considerable importance to the sphygmographic tracing as revealing an early stage of degeneration.

PROGNOSIS.—This merely involves a knowledge of the dangers which accompany degeneration, so that they may be guarded against. Many live to a good old age with the vessels much diseased, but at any moment there is a liability to dangerous lesions. The earlier the degeneration comes on the more serious is the prognosis.

TREATMENT.—All that can be done is to avoid everything which is likely to throw a strain upon the vessels; and to maintain the nutritive activity of the system as much as possible by diet, tonics, and cod-liver oil, the last being often decidedly useful. Any constitutional diathesis must be attended to, and all injurious habits checked.

both sides. 7. The radial pulse often affords important signs,
lly to the sphygmograph. The chief characters are that the pulse
ed on one side; or that it differs in fulness and force on the two
The sphygmograph reveals even a slight difference in the two
but this is very marked in some cases. The dicrotism is often
ed also, and when the descending aorta is involved, this may be
creased, especially on the right side. An aneurism is capable
ncing the pulse by its own direct effect upon the circulation;
o by obstructing the main arteries in consequence of pressure,
of their orifices by a clot, or torsion.

s OF TERMINATION.—Death is the ordinary termination of
eurism, and it may be immediately due to—1. Gradual asthenia.
ts of pressure. 3. Rupture and hæmorrhage, which may take
to the pericardium, heart, neighbouring great vessels, pleura,
num, trachea or either bronchus, lungs, œsophagus, spinal canal,
ally. 4. Independent affections, either acute or chronic.

osis.—It would be easy to write to almost any extent on the
s which might and do arise in the diagnosis of thoracic aneu-
t it must here suffice to offer a few general observations on the

It is not only necessary to determine the presence of an
, but also its seat, variety, size, and other characters as accu-
possible. In some cases the signs are so evident, that there is
difficulty in making out all that is required; but the following
f difficulties are met with, viz.:—1. There may only be symp-
licating more or less pressure within the thorax; or sometimes
scure and ill-defined sensations, with constitutional disturbance,
ternal signs. 2. An aneurism may give rise to the physical signs
our, but without any pulsation or murmur. 3. Other pulsating
ces are occasionally observed besides aneurisms, the pulsation
ally transmitted from the heart or aorta.

ief morbid conditions which aortic aneurism is liable to simulate,
ersâ, are a solid mediastinal tumour or abscess, the latter
lly presenting pulsation; pulsating empyæma; phthisical con-
at the left apex, with subclavian or pulmonary murmur;
ver the sternum from chronic periostitis or abscess; a tumour
ration in other parts of the chest walls; pericardial effusion;
te aneurism; cardiac disease. Among very rare conditions
mentioned coarctation of the aorta; varicose aneurism; and
of the pulmonary artery.

ints to be taken into account are as follows:—1. The age and
e patient; previous history, especially with regard to occupa-
ly history, and that of the origin and progress of the com-
. The presence or absence and exact characters of pressure-
. The other symptoms observed, particularly noting whether
general dropsy or albuminuria. 4. The exact situation of
inence. 5. Should there be any pulsation, attention must be
s precise site, extent, rhythm, and characters, especially as to
t is heaving and expansile, double, or attended with thrill;
s distinct from the cardiac pulsation. 6. With regard to dul
necessary to notice its site and extent, especially whether it is
urse of the aorta or crosses the middle line; and if it corre-

for mere cardiac enlargement. The principal cir
of cardiac disease are, there being but one ce
physical signs being in the region of the heart, o
the absence of pressure-symptoms; and the presen
or albuminuria.

As regards the form of an aneurism, the signs
fusiform dilatation are given by Walshe as more di
above and below the clavicle; well-marked thrill
rasping, whizzing, or whirring murmur, which is sy
the arch, or louder there than over the aortic orif
slight degree of pressure-signs.

The part of the vessel affected must be determin
the physical signs, and the exact pressure-signs ob
of the radial pulses, especially as revealed by the
afford some aid.

In distinguishing innominate aneurism from aorti
siderations have weight:—The physical signs corre
of the innominate artery; the prominence appear
displace the clavicle; it is said that dysphagia an
pressure of an innominate aneurism are rare, but
these symptoms extremely severe; there are often
the nerves of the right brachial plexus, and on the
right radial pulse is always modified; and pressur
subclavian arteries on the same side diminishes the

TREATMENT.—The first object in the treatment of
be to endeavour to bring about its cure by promot
this can only be aimed at in the case of a sa
Failing this, it is necessary to protect it; retard
much as possible; and treat the symptoms and com
frequently arise.

If it is intended in any case to attempt to cure a ervous irritability. Excess of fluid must be particularly d all stimulants are to be prohibited. In some instances it visable to remove a little blood from time to time, but it is ant to avoid inducing an anæmic condition.

cts of this attention to rest and diet are to calm the circula- h as possible, and to render the condition of the blood more or coagulation, and undoubtedly some cases do improve under this treatment alone. Medicinal agents, however, oyed with benefit at the same time, viz., those which subdue the heart's action, such as digitalis, aconite, or belladonna; hich promote coagulation, particularly gallic or tannic acid, steel, acetate of lead, and iodide of potassium. The last ery well spoken of by Dr. Roberts of Manchester and of Edinburgh, when given in large doses, even as much as 30 grains thrice daily, and continued for a long period. y watery purgatives, in order to remove the watery portion , but this treatment is of more than questionable efficacy.

ssary to mention certain operative procedures to which re- een had with the view of curing aortic aneurism. These ection of perchloride of iron into the sac. 2. Manipulation externally. 3. Galvano-puncture. 4. Introduction of a ine iron wire through a canula. 5. Ligature of the right subclavian arteries.

occupy too much space even to mention the various symp- omplications which may require attention in the progress of eurism, and only a few practical points can be alluded to always well to keep the aneurism covered with cotton-wool, it be particularly prominent, some kind of protecting shield rn. For relieving pain and procuring sleep, the chief in- lies are opium, hyoscyamus, lactucarium, hydrate of chloral, in full doses. Subcutaneous injection of morphia is most External applications are also useful, such as belladonna or er; belladonna or aconite liniment; cold poultices of lin- nd vinegar, conium, digitalis, or oak-bark (Walshe); ice, or chloroform cautiously applied; counter-irritation by s or iodine, which sometimes gives marked relief. Galvano- netimes relieves pain considerably, as in a case thus treated n. If there are severe laryngeal symptoms, evidently due n the recurrent nerve, it is decidedly justifiable to perform and let the patient wear a tube. It has been suggested cases the sterno-clavicular ligaments might be divided, in w displacement of the clavicle forwards, and thus take off behind.

CHAPTER XXVI.

MEDIASTINAL TUMOURS.

AORTIC aneurism is the most frequent form of mediastinal enlargement, and therefore it has appeared to me best to introduce what has further to be said on the subject in this place. The other chief varieties met with include cancer (either encephaloid or scirrho-encephaloid), originating in the œsophagus, lymphatic glands, root of the lung, or thymus gland; fibro-cellular, fibrous, or fibro-fatty tumours; enlarged masses of glands in tuberculosis or Hodgkin's disease; inflammatory exudation and abscess; very rarely masses of steatoma or hair.

SYMPTOMS AND SIGNS.—The symptoms are mainly those indicative of pressure, and they accordingly present the usual variations. "Current-jelly" expectoration is said to be common in cancer. There may be constitutional symptoms of this diathesis. The *physical* signs of a solid tumour are also widely different, but the following list will suggest those which are to be sought for. 1. Local bulging, especially in front, of variable extent, often irregular, not pulsating. 2. Deficiency or absence of respiratory movements over the seat of the growth, or in some instances over the whole of one side, from pressure on a bronchus. 3. Altered percussion-sound, often over a considerable area, it being either dull and toneless; hard, wooden, and high-pitched; or occasionally tubular or amphoric; there being also marked resistance. 4. Respiratory-sounds weak or absent, blowing, or tubular, according to the relation of the enlargement to the main air-tubes. 5. Vocal fremitus usually absent; and vocal resonance either deficient, bronchophonic, or pectoriloquous. 6. Dry and moist râles in the bronchi, which are not infrequent. 7. Displacement of the heart and other structures; increased conduction of the heart-sounds; and occasionally a murmur, from pressure on a great vessel.

DIAGNOSIS.—Mediastinal tumour has in the first place to be distinguished from other morbid conditions within the chest, especially chronic pneumonia; chronic pleuritic effusion; pericardial effusion; and enlargement of the heart. Careful consideration of the history of the case, as well as of its symptoms, physical signs, and progress, will rarely leave much doubt as to the diagnosis thus far. It is much more difficult, however, to determine the nature of any mediastinal enlargement. In the diagnosis between aneurism and a solid tumour, when this is at all doubtful, the following considerations have weight, these having been chiefly compiled from the observations of Dr. Walshe:—1. The facts of the patient being a female and under 25 years of age point to a solid tumour; the family history may be suggestive of cancer; or the occupation may be in favour of aneurism. 2. As regards symptoms, dysphagia and severe pain, especially posteriorly, are more common in aneurism; œdema of the arm and chest, frequent hæmoptysis, and current-jelly expectoration, are more characteristic of tumour. Occasionally cancer-elements may be discharged in the sputa. 3. The physical signs are of much value. The limitation of these to the region of the aorta; the presence of any thrill; a double

regard to the distinction between different solid enlargements,
can be stated is that cancer is the most common ; there may
s of the cancerous cachexia or of cancer in other parts ; while
nt hæmoptysis is by far most frequent in this form of tumour, or
ells may be expectorated. It also grows outwards, and has a
ogress.

TMENT.—All that can be done is to relieve symptoms as they

CHAPTER XXVII.

RTAIN ABNORMAL CONDITIONS OF THE BLOOD.

od is liable to numerous deviations from a healthy state, but of
erations, though they are interesting and important, the limits of
k will only permit a general outline, except in some particular
s. The changes observed may be arranged as follows :—
the absolute quantity of the blood. This may be :—1. Excessive
a). 2. Deficient (hyperæmia or anæmia). II. *In obvious physi-*
acters. The blood may be unusually pale and watery ; dark from
t ; thick and tarry ; or the serum has sometimes a milky appear-
ue to the presence of fat. III. *In the number and characters of*
uscles. 1. The red corpuscles may be :—(*a*) deficient (oligocyth-
(*b*) in excess (polycythæmia) ; or (*c*) altered in shape and size,
heir tendency to and mode of mutual adhesion. 2. The white
les are often too numerous, but this is particularly seen in the
n named *leucocythæmia*, which will be considered under splenic
s. IV. *In the normal chemical constituents.* 1. Fibrin may be :—
reased (hyperinosis) ; (*b*) diminished (hypinosis) ; or (*c*) altered
tendency to coagulate. 2. Albumen is frequently deficient ;

not uncommonly observed, such as abundant pigment-granules (melanæmia); pus corpuscles; animal or vegetable parasites.

In numerous instances more than one form of deviation is observed.

ANÆMIA—SPANÆMIA—CHLOROSIS.

The term *anæmia* is used very vaguely, and, in addition to its strictly literal sense, it is applied in practice to three classes of cases, viz.:—Where the blood is deficient in quantity; where it presents certain abnormal qualities; and where the arteries are inadequately filled. These conditions, however, are usually more or less combined. The chief alterations in quality are deficiency of red corpuscles, as well as often of albumen; with excess of water and salts, the serum having a low specific gravity. Fibrin is proportionately high, and the blood has a tendency to coagulate in the veins. *Chlorosis* or *green sickness* merely signifies that there is a peculiar greenish tint, such as is frequently observed in anæmic girls, associated with menstrual derangements, the colour being supposed to depend upon some chemical change in the blood pigments.

ETIOLOGY.—Very many causes may give rise to anæmia, but the chief include considerable loss of blood at one time, or repeated small losses; unfavourable hygienic conditions, especially constant sedentary or laborious employment in a confined atmosphere, with deficiency of sunlight; improper or insufficient food, particularly a want of animal diet; impaired power of digestion; excessive drain upon the system, such as over-lactation, diarrhœa, or chronic suppuration; prolonged exposure to malarial influence, with or without attacks of ague; various chronic diseases which interfere with nutrition, *e.g.*, phthisis, cancer, renal or splenic disease, gastric ulcer; acute febrile diseases; excessive venery or masturbation; depressing mental influences; chronic poisoning by lead, mercury, and other metals. In many instances several of these causes have combined in inducing anæmia. A pale anæmic aspect may be a striking feature in persons suffering from mitral or aortic disease, but this is partly due to insufficient filling of the arteries.

Females, especially from 15 to 25 years of age, are most frequently the subjects of anæmia or chlorosis. This has been supposed to be mainly the result of the great demands made on the developmental powers about the period of puberty, but commonly it will be found in the history of these cases that there are some other obvious causes, which at all events have aided materially in giving rise to the anæmic condition, the most important being long-continued habitual constipation, which necessarily leads to derangement of the digestive organs and consequent imperfect nutrition; and abstinence from animal food, this being the consequence of the loss of appetite, or rather disgust for food, which is necessarily associated with the unhealthy state of the alimentary canal. Other influences are also frequently at work in these cases, such as deficient exercise; close confinement; over-work, particularly with some sewing machines; and mental depression.

SYMPTOMS.—The aspect of persons suffering from anæmia is, as a rule, sufficiently characteristic. They are pale, often waxy-looking, and have a clear transparent skin; or, as already mentioned, a greenish or sh-green hue is observed in chlorotic girls. The veins are fre- r, however, very evident, and may have a peculiar pinkish tint. The s membranes present the most marked signs of anæmia, espe- he conjunctiva of the lower eyelid, and the membrane covering s, gums, and tongue, these being more or less pale and bloodless. clerotics appear clear and bluish. The general condition will ccording to the cause of the anæmia; in chlorosis the patient is apparently well nourished, though the tissues are usually flabby nting in tone. Œdema about the ankles, and puffiness of the in the morning are common symptoms, and there may even be erable anasarca of the legs after standing for some time. The f anæmia in promoting dropsy from other causes has been pre- alluded to.

subjective sensations complained of are also very uniform in ic girls. These are debility, languor, and incapacity for exer- general chilliness and coldness of the extremities; shortness of and palpitation after any effort, or even without this; sometimes ency to syncope; headache, dizziness, and noises in the ears; ic and hysterical pains in different parts of the body, but espe- the left side, this being frequently accompanied with tender- d being liable to come and go. It has appeared to me that in in the left side may possibly be connected with the spleen in ases. Anæmic females are often low-spirited or irritable, and to hysterical attacks.

digestive organs are usually at fault. Appetite is impaired or d, and there may be an absolute disgust for food, especially Gastralgia and atonic dyspepsia are common. The bowels are tely constipated as a rule. Hæmatemesis and melæna occa occur. Menstruation is almost always deranged, being absent, nt, irregular, scanty, unhealthy, painful, or sometimes menor- Leucorrhœa is also frequently present.

in abnormal *physical signs* are observed in marked anæmia, ave been already described, and therefore need only be enume- ere, viz., a systolic murmur at the base of the heart, usually ary; a blowing murmur in the arteries, especially the sub- and sometimes a thrill; and venous hum, which is in some en heard over the cranium, and may also be accompanied with The heart's action is very liable to be disturbed, becoming xcited and hurried, and in severe cases even irregular. The s small, feeble, and compressible; or sometimes scarcely per- .

urine frequently presents important changes, being pale and excessive in quantity, of low specific gravity, deficient in acidity, narked decrease in the amount of pigment.

believed that anæmia may ultimately lead to organic diseases, phthisis or gastric ulcer. Acute affections occurring in anæmic als are apt to assume a low type, and to be followed by pro- convalescence.

TMENT.—The first thing to be done in all cases of anæmia is to its causes and remove these if possible. Attention to hygienic ns is most essential, especially in the case of chlorotic girls.

Fresh air, good light, out-door exercise, avoidance of late hours and of hot and crowded rooms, change of air and scene to some dry and bracing climate, especially to the sea-side, cheerful society, and the removal of all disturbing mental influences are most efficient aids in treatment. Baths, particularly sea-bathing, or douches followed by friction are very beneficial, if followed by good reaction. It is also most important to look to the diet, and to the state of the digestive organs. Nutritious food must be given at stated intervals, and it is often requisite to lay down strict rules on this matter, particularly with regard to meat, to which many of these patients have a strong objection. It ought to be taken underdone, and if it causes pain it may be pounded. Nutritious soups are also useful, and beer or wine is generally indicated. The state of the bowels demands particular notice, and the patient should be fully impressed with the necessity of having a sufficient daily evacuation. Aloes is one of the best forms of aperient in these cases, given at night in the form of pil: aloes c̄ myrrh; or as extract. Remedies which act upon the stomach are frequently very beneficial also, bismuth with hydrocyanic acid being particularly valuable in relieving the unpleasant and painful sensations connected with this organ, when taken shortly before meals.

Iron in some form is the great remedy in anæmia. The mist: ferri. co: is eminently efficacious in chlorosis, and among other excellent preparations may be mentioned pil: ferri. co; the saccharated carbonate; the ammonio-citrate; and the ferrum redactum. Tincture of steel is invaluable in many cases, especially when the anæmia is associated with excessive discharges. The solution of the pernitrate, the sulphate, and magnetic oxide are also very useful preparations; while in anæmic children steel wine and the tartrate produce excellent results. Chalybeate waters are beneficial in some instances. Iron may be combined wtth infusion of quassia or calumba, or with quinine or strychnine, and some practitioners recommend it to be given along with arsenic, manganese, pepsine, and other remedies. The citrate of quinine and iron and Easton's syrup are very valuable preparations. It is frequently desirable to change the form of the preparation from time to time: or even to stop the administration of iron temporarily, should it appear to disagree.

The pain in the side often requires attention in chlorosis, and is usually much relieved by wearing a belladonna plaster.

PYÆMIA—SEPTICÆMIA.

This is a subject belonging principally to surgery, and in this work it is merely intended to indicate the chief practical facts with regard to the affection as it is occasionally presented in medical practice.

ETIOLOGY.—Excluding obvious injuries and operations, the causes of pyæmia or septicæmia may be arranged as follows:—1. Disease of bones, either acute or chronic, leading to suppuration; it may thus arise from disease of the temporal bone. 2. Affections of the heart or vessels originating septic materials which contaminate the blood, *e.g.*, endocarditis; softening of clots, especially in the veins; phlebitis. 3. Formation of abscesses or gangrene in any part, either external to or within organs. 4. Ulceration of mucous surfaces, *e.g.*, the gall-bladder or its duct, or the intestines. 5. Inflammation of a low type and attended

6. Idiopathic pyæmia has been described, but it
borne in mind that pyæmia may follow a very slight injury in
subjects, and that there are many internal causes which might
tection.

ICAL CHARACTERS.—It is highly probable that death may
n pyæmia without any characteristic post-mortem appearances
The morbid changes which it tends to originate may be
up thus:—1. Intense congestion throughout the various organs
s of the body. 2. Hæmorrhages, in the form of petechiæ or
connection with the skin, mucous and serous membranes;
ge into serous cavities; extravasations into muscles and among
es; and apoplectic clots in the substance of organs, which are
undergo rapid destructive changes. 3. Acute inflammation in
organs, of a low type. 4. Formation of abscesses in these
ften in considerable numbers, of good size, and containing
pus; resulting either from hæmorrhagic clots, inflammation,
ing. 5. Gangrene of portions of organs. 6. Low serous
ions, with a tendency to purulent effusion, which may be con-
in abscesses, and to the production of unhealthy lymph. 7.
ion of mucous surfaces, leading to suppuration, ulceration, or
to submucous abscesses or gangrene. 8. Severe inflamma-
ints, with a great tendency to rapid formation of pus and
n and disorganization of tissues, both within and around the
eral of them being usually involved. 9. Inflammation and
of abscesses in various parts of the body, viz., in the substance
s; in the cellular tissue, either superficial or deep; and some-
e skin itself, giving rise to pustules.

MS.—In many instances pyæmia reveals itself very insidiously,
aracteristic symptoms in an acute case are mainly these:—
in suddenly, severe and prolonged in character, and repeated
r intervals. The temperature often rises rapidly to a high
ig usually very elevated throughout, but subject to marked and

the teeth and gums; delirium, coma, or, rarely, convu
last, with involuntary discharge of fæces and urine.

In some instances pyæmia is evidenced chiefly by
toms; in others it runs a somewhat chronic course,
minate in recovery. Some authorities regard certai
will hereafter be considered, as originating in a local p

DIAGNOSIS.—It is important to distinguish pyæmia f
and acute inflammatory affections which it may simula
mind its possible occurrence in connection with the r
mentioned under its etiology. In some cases its cour
causes the complaint to resemble ague.

TREATMENT.—The only chance of recovery lies in
lar administration of nutritious food, stimulants, and
mineral acids, bark, quinine, and tincture of steel.
been strongly recommended. Local lesions must b
they arise.

CHAPTER XXVIII.

THROMBOSIS AND EMBOLISM

BY *thrombosis* is meant a local coagulation of blood
within the heart or a vessel, a clot being thus formed, n

Embolism signifies the partial or entire plugging of
a solid fragment or *embolus* conveyed from some distan

I. THROMBOSIS.

ETIOLOGY.—The causes which tend to the formation of
be thus stated:—1. Anything which impedes or retards t

fissuring of the surface; atheroma or calcification; projection of cancerous and other new formations into the interior of vessels; and the changes in their walls associated with surrounding gangrene or inflammation. 3. Certain conditions of the blood, viz., hyperinosis or increased tendency in the fibrin to coagulate, such as may be observed in various acute inflammatory affections and pregnancy; probably pyæmia and allied states; and anæmia. Increased heat of the blood, either local or general, has been looked upon by Richardson and others as a probable cause of thrombosis. In many instances more than one of the above-mentioned conditions has contributed to the clotting process.

In further considering this subject it will be convenient to treat separately thrombosis of the heart, pulmonary, and systemic vessels.

Cardiac Thrombosis.—Intra-cardiac Blood-concretions.—Coagula may form in the heart after death; immediately before this event; or at some previous period more or less remote. These are distinguished from each other by their colour; consistence; mode of arrangement with regard to and degree of adhesion with the cardiac walls; whether they are laminated or not; and whether they have undergone changes, either in the direction of organisation or softening. It is desirable to make a few special remarks respecting the coagulation occurring shortly before death, as this is probably often a very dangerous event, and one which aids materially in bringing about a fatal result. It is observed in connection with organic diseases of the heart which obstruct the circulation or roughen the endocardial surface, but is most important in certain acute diseases, being then due to a condition of the blood favourable to coagulation, combined with a gradual loss of power in the cardiac contractions, in consequence of which the blood is not properly expelled out of the heart, but is partially whipped up and its fibrin deposited. Obstruction in the lungs frequently contributes to the clotting process. Among the most important diseases in which this is observed are croup, diphtheria, endocarditis, pneumonia, peritonitis, the puerperal condition, erysipelas, rheumatic fever, and pyæmia and its allies. Cardiac thrombosis is much more common as well as more dangerous in the right cavities than the left, but may occur on both sides. Usually the clots are decolorized, pale or yellowish, but not uniform throughout; firm and fibrinous; often laminated and fibrillated or granular; entangled among the muscular bands and tendinous cords; somewhat adherent to the surface, but separable without injuring the endocardium. Occasionally they soften in the centre. They may extend a variable distance into the pulmonary artery or aorta, these portions frequently presenting marks of the valves, but they can be readily removed.

Symptoms and Signs.—The effects of cardiac thrombosis will vary with the rapidity of its production, its seat, and extent. The dangers are that it causes obstruction to the circulation and interference with the heart's action; that large portions may become detached, and lodged either in one of the main orifices or in an arterial trunk; or that smaller particles should be separated, and conveyed into the smaller vessels as emboli. Probably also the products of the softening of a clot may poison the blood generally. Sudden extensive clotting is characterised by great disturbance of the cardiac action, which becomes irregular and very hurried, the pulse being extremely weak and small; a tendency to syncope; urgent dyspnœa; intense restlessness and anxiety; followed by signs of obstruction, either in the pulmonary or venous circulation or both, according to the situation of the clot. In less rapid cases the obstructive symptoms are chiefly observed, with more or less cardiac distress. Plugging of an orifice or great vessel by a clot may cause instantaneous death. The *physical signs* are tumultuous action of the heart, or great irregularity in the rhythm and force of the impulse; increased cardiac dulness, especially towards the right; obscurity and irregularity of the sounds, particularly the first; and alteration in murmurs, or the production of a new murmur, especially pulmonary systolic.

TREATMENT.—The measures required in this condition are absolute rest in the recumbent posture; stimulants, especially if there is a syncopal tendency, with as much liquid nourishment as the patient can take comfortably; heat to the extremities; and free dry cupping over the chest. Formerly alkaline bicarbonates were recommended to be freely administered with carbonate of ammonia. Dr. Richardson has advocated the use of liquor ammoniæ (♏ x in iced water every hour), with iodide of potassium (gr. iii to gr. v every alternate hour), which he has found highly successful. In some instances digitalis might, perhaps, be of use in order to excite stronger contraction of the heart; or gentle galvanism might be tried. All lowering measures are injurious, and opiates must be avoided.

THROMBOSIS IN THE PULMONARY ARTERY AND ITS BRANCHES.—Much discussion has been carried on relative to pulmonary thrombosis, especially as it occurs in women after parturition. Occasionally such persons die suddenly, and after death extensive clots are found in the pulmonary artery and its divisions, which some believe to have been the cause of death, and to have formed there primarily and independently; others think that they are the result of embolism, fragments having become detached from clots in the veins or heart, and lodged in the pulmonary vessels as centres for coagulation: while still others regard death as being due to syncope, and the clot to be merely of post-mortem formation. The probability is that in most instances at all events embolism has something to do with the phenomena observed; and it is quite possible that a large mass may be sometimes carried into the pulmonary artery so as to obstruct this vessel.

Clots may be found only in the main trunk and larger divisions; in the smaller branches; or more or less throughout. According to the extent involved and to the rapidity of coagulation will the clinical phenomena vary. In some instances, as already stated, sudden death is believed to occur, preceded by a cry, resulting from some effort after parturition. When only the smaller branches are affected there are no symptoms. If the clotting is more extensive, the symptoms are more or less dyspnœa and sense of want of air, with oppression across the chest; evidences of cardiac embarrassment; faintness or actual syncope; much general distress and anxiety; followed by signs of overloading of the right heart and general venous congestion. The symptoms may temporarily subside and then recur. It is highly probable that coagulation in the pulmonary vessels often adds to the danger of various lung and general diseases, and prolongs the duration of the former.

TREATMENT must be similar to that for cardiac thrombosis.

THROMBOSIS IN THE SYSTEMIC VEINS.—PHLEGMASIA DOLENS.—The formation of clots in the systemic veins is by no means an uncommon occurrence, resulting from pressure, obstruction, feeble circulation, altered blood, and other causes, but it is most important in connection with the affection named *phlegmasia dolens*, in which as a rule the lower extremity is involved, the external iliac or femoral vein becoming obstructed on one or both sides, or sometimes the common iliac; occasionally the arm is affected. The formation of clots in the venous sinuses of the dura mater is also a very serious matter, which I have observed as the result of injury or disease of the cranial bones.

Phlegmasia dolens is most frequently associated with the puerperal state, coming on at a variable period after delivery, but it may also occur as a sequela of acute febrile diseases, especially typhus and typhoid fever, pleurisy and pneumonia; and in the advanced stages of various chronic diseases, particularly phthisis and malignant uterine disease. Different views are held as to the pathology of this affection. Some regard inflammation of the veins—*phlebitis*—as the primary lesion after parturition, this having extended from the uterine veins; others consider that the plugging is the first event, resulting from impure blood or embolism, the emboli frequently coming from thrombi in the pulmonary vessels, and that the inflammation is secondary. Certainly in the cases which have fallen under my observation, where phlegmasia has arisen independently of parturition, coagulation has appeared to be the primary morbid condition, and it has sometimes been brought about by an effort, especially when this was accompanied with temporary obstruction of the venous circulation in some part.

ANATOMICAL CHARACTERS.—A thrombus in a vein varies in its characters according to its age and mode of formation. If a vessel is suddenly plugged, the clot is at first uniform throughout, soft and red; but if this is gradually formed it presents a stratified appearance, and the strata may consist of alternate layers of fibrin and white corpuscles. The thrombus increases in extent after its first formation, the degree of extension depending chiefly on the force of the circulation, and on the size and situation of the collateral branches. The thrombus undergoes the usual changes in colour and consistence; becomes adherent to the vessel, in which it frequently excites inflammation; and organisation often follows, so that ultimately a fibrous cord alone remains, the vein being obliterated—*adhesive phlebitis*. Occasionally calcification takes place, a "phlebolith" being produced. In some instances the clot undergoes partial or complete softening or liquefaction, beginning in the centre, and a puriform fluid may result, consisting either of granules and molecules derived from the fibrin, with broken-down corpuscles; or, as some believe, of actual pus derived from proliferation of white corpuscles. This is probably the pathology of so-called *suppurative phlebitis*. In this way the clot may be completely removed; or substances are originated which contaminate and poison the blood.

In *phlegmasia dolens* the smaller veins and lymphatics also become speedily involved, and more or less inflammation is in many cases set up in the skin and subcutaneous tissue, or even in the deeper structures.

SYMPTOMS AND EFFECTS.—The symptoms which may be associated with venous thrombosis are those due to :—1. Local irritation by the clot.

2. Obstruction of the vein and consequent interference with the circulation. 3. Detachment of embolic fragments. 4. Constitutional disturbance, which may result from the formation of septic matters and contamination of the blood. In *phlegmasia* pain and tenderness along the veins and lymphatics of the thigh are usually complained of to a variable degree. One case which came under my notice, in which the disease followed typhus fever, commenced with a sudden intense pain at the moment of coagulation, which afterwards became most excruciating, deeply situated in the course of the femoral vein, and of an aching and somewhat neuralgic character. In phthisis, also, phlegmasia is often the cause of much distress. The veins are in time felt to be thickened and firm or cord-like, and the lymphatics are visible as red lines. Soon there may be signs of venous congestion, but very speedily this is followed by a deadly whiteness of the limb (*white leg*), which swells from below upwards, chiefly on account of œdema, sometimes attaining an enormous size, and becoming tense or elastic, with a most uncomfortable subjective feeling of tightness. In time the superficial veins become enlarged and varicose if the obstruction is not removed, and the leg often remains swollen for many months or even permanently, the tissues being thickened and indurated. Rigors may be experienced at the outset, followed by pyrexia and much prostration.

TREATMENT.—In *phlegmasia dolens* the most efficient treatment is to support the patient by nourishing food and stimulants; to keep the leg perfectly at rest in a horizontal posture or even a little raised; to use hot opiate or belladonna fomentations assiduously; and to give sedatives for the purpose of relieving pain, if required. Subsequently tonics, especially iron and quinine; good diet; and change of air are most beneficial; with douching, frictions, and shampooing of the limb, which must either be carefully bandaged, or an elastic stocking be worn. Great improvement may be effected even after a long interval.

THROMBOSIS IN THE ARTERIES.—This is almost always associated either with a diseased condition of the walls of a vessel; or with embolism. Its symptoms are merely those indicative of local obstruction of arteries.

II. EMBOLISM.

ORIGIN OF AND ANATOMICAL CHANGES RESULTING FROM EMBOLI.—The following are the principal sources of emboli:—1. Most commonly a thrombus in a systemic vein; in the heart; in an artery, especially in connection with aneurism; or rarely in the pulmonary vessels. 2. Vegetations about the valves and orifices of the heart, particularly if associated with obstructive disease, especially mitral stenosis. 3. Atheroma and calcification of the cardiac valves or of arteries, portions of the morbid materials becoming detached. 4. New growths, *e.g.*, cancer, communicating with the interior of vessels. 5. Particles resulting from gangrene of organs. 6. Parasites which have gained access into the vessels. 7. Pigment granules. 8. Fat particles from bone-marrow.

According to the size and place of origin of the embolus will the seat of its arrest vary. It may be sufficiently large to plug an artery of considerable size, or is only stopped in the capillaries. When originating in the venous portion of the circulation emboli rarely pass through the

monary capillaries, but become impacted there as a rule; those
ing from the pulmonary vessels, the left side of the heart, or the
ries, lodge either in smaller arteries or in the capillaries, and espe-
ly in the vessels of the brain, spleen, and kidneys; those from the
tal tributaries are generally arrested in the capillaries of the liver.
embolus is chiefly carried in the direction of the main stream, and
is somewhat influenced by gravitation. The seat of impaction is
at a bifurcation, and the closure may be complete or only partial
st, but a secondary thrombus always forms, so that ultimately the
el is entirely blocked up to a variable extent. Secondary emboli
sometimes separated from the primary one or the resulting thrombus,
pass on into smaller vessels. Embolism causes local irritation in
vessel in which it lodges, and is soon followed by marked hyperæmia
the collateral vessels around, extending over a variable area, which
terminates in their rupture, with the formation of a *hæmorrhagic*
rct. In time the latter either becomes decolorised, more consistent,
organised; or a process of softening and molecular disintegration
place, beginning in the centre of the infarct, and extending more
to the circumference, the *débris* of the involved tissue being
ent in the softened mass. Ultimately it may be absorbed; or re-
as a caseous encapsuled mass; or become calcified. The nature
he changes will depend upon the degree to which the circulation is
ucted, and the difficulty in establishing the collateral circulation;
tissue affected; the size of the infarct; and the character of the
olus. If this has septic properties, as when it comes from a gan-
ous part, it sets up rapid and violent inflammation, ending in speedy
ganisation with the production of a puriform material, constituting
bolic abscess, which is surrounded by hyperæmia.

he effects of an embolus as regards the part supplied by the vessel
h is blocked up are similar to those of obstruction from any other
e, viz., anæmia, atrophy, softening, fatty degeneration, or actual
rene.

he most important seats of embolism are the vessels of the lungs,
a, spleen, kidneys, and heart. Petechial spots on the skin, mucous,
serous membranes are sometimes due to this cause. A very in-
ting case came under my notice in which sudden embolism oc-
ed in connection with the main vessels of the fore-arm.

MPTOMS.—The clinical phenomena of embolism necessarily vary
ly according to the vessels affected; the rapidity and degree of
uction; the characters of the embolus; and other circumstances.
ed only be stated here in a general way that the symptoms are
significant of sudden or gradual obstruction of the vessels supply-
ome organ or part; followed by those indicating the local effects
e embolus, and in some cases by evidences of septicæmia. Em-
n affecting particular organs is considered in their respective
ers.

Chapter XXIX.

DISEASES OF THE ABDOMEN.

Physical Examination of the Abdomen.

Before proceeding to the consideration of the diseases of the abdomen and its contained organs, it is necessary to point out the various methods of "physical examination" which may be employed in their investigation; and to indicate the information which each of them is capable of affording. In order to make this examination satisfactorily, the abdomen should be properly exposed, and the patient placed in an appropriate position. The best posture ordinarily is on the back, with the head and shoulders considerably raised and the knees and thighs bent, so that the abdominal muscles may be relaxed; however, it is requisite in many cases to make the patient assume other positions, such as lying on either side or on the face, or kneeling supported on the hands and knees. The patient should be desired to breathe deeply, or the attention may be occupied with conversation, so that a state of contraction and tension of the muscles may be avoided, which is very apt to be produced. The examination should be carried out carefully and thoroughly, and not uncommonly it has to be made on more than one occasion before a satisfactory conclusion can be arrived at.

The following outline indicates the different modes of examination which might be required in the investigation of any particular case, though it does not often happen that they are all called for in the same individual. Some of them are similar to those employed in the exploration of chest-affections, though their relative value is very different; others are peculiar to the examination of the abdomen.

I. Inspection.—By this method is ascertained:—1. The state of the superficial parts, viz., the integuments, superficial veins, umbilicus. 2. The general shape and size of the abdomen; as well as any local alterations in these respects. 3. The characters of the abdominal respiratory movements. 4. The presence of any visible pulsation. 5. Certain movements, such as those due to flatus; to fluid when the position of the patient is altered; or to the presence of a fœtus

II. Application of the Hands, Palpation, or Manipulation.—If properly carried out, this becomes one of the most valuable methods of examination in the investigation of the diseases of the abdomen; but it requires considerable practice, and the hands have to be employed in different ways in different cases.

Palpation reveals:—1. The condition of the abdominal walls, as regards amount of fat, œdema, and the state of the muscles. 2. The shape and size of the abdomen more accurately than inspection. 3. The sensations conveyed as regards mobility of the abdomen as a whole, degree of resistance, consistence, fluctuation, regularity and smoothness or the reverse, over the surface generally and over its different parts. 4. The existence of any enlarged organ or tumour, with its position and

aracters. 5. The extent of the respiratory movements, and their in-
ence upon any tumour which may be present. 6. The situation and
aracters of any pulsation. 7. The presence of friction-fremitus de-
loped during the act of breathing. 8. Any movements set up within
e abdomen, such as gurgling from gas in the intestines, or fœtal move-
nts.

III. MENSURATION OR MEASUREMENT.—Merely an ordinary single
d double measuring tape of sufficient length are required for measure-
nt, and this affords exact information as to the size of the abdomen,
the diaphragmatic respiratory movements. It is particularly valu-
as showing the progress of many cases, with the effects of treatment.
measurements ordinarily required are—1. Circular in different parts,
specially a little above and below the umbilicus. 2. Semicircular,
to compare the two sides. 3. Local, viz., from the umbilicus to the
form cartilage; to the pubes; and to the anterior superior spine of
um on each side.

V. PERCUSSION.—"Mediate percussion" is usually practised in the
of the abdomen. A modification of this is employed in the pro-
ion of what is termed *hydatid-fremitus* or *vibration*, which is elicited
pplying three fingers of the left hand firmly over certain cystic
urs, and striking the middle finger suddenly with the point of the
middle finger. Another method consists in applying the fingers of
hand over one side of the abdomen, and tapping or filliping the
site side with those of the other hand, which is the usual plan for
cing fluctuation.

he objects of percussing the abdomen are:—1. To bring out certain
ds. 2. To realize certain sensations by the fingers, especially the
ee of resistance; hydatid-fremitus; and fluctuation. The sounds
ed may be grouped under the terms *dulness* and *tympanitic sound*,
e necessarily varying somewhat in their exact characters. In the
al state they are both met with over different parts of the abdomen,
rding to the organ which corresponds to the point percussed, and
his mode of examination the exact position and limits of most of the
ns can be marked out. The deviations, as regards sound, which
be observed are:—(i.) Excess in the intensity, clearness, or extent
e tympanitic sound. (ii.) Dulness either too extensive; or in un-
l positions. The last is the deviation which requires most attention.
when any abnormal dulness is detected, it is necessary to make out
ully—*a*. Its site, exact limits, and shape. *b*. Whether it differs
rding as superficial or deep percussion is made. *c*. If it is influenced
osture; the act of breathing; pressure; or manipulation; and in
doubtful cases it may be requisite to observe the effects upon it of
g food or drink; of the act of vomiting; the use of an enema; or
emoval of urine by a catheter. With respect to resistance, by
ing its degree an accumulation of fluid may be distinguished from
d mass, and the actual density of the latter can to a great extent
alized; it is likewise useful in separating flatulent distension of the
nen from that due to the presence of fluid.

datid-fremitus is a peculiar vibrating or trembling sensation, pro-
in the manner already described, and formerly supposed to be
cteristic of hydatid tumours, but it can be brought out in connec-

tion with any large cyst which has thin and tight walls and contains a fluid of watery consistence.

Fluctuation indicates the presence of fluid within the cavity of the abdomen, and it is needful to observe the degree of facility of its production and its distinctness, the part of the abdomen over which it is felt, and whether it is influenced by change of posture; thus information is obtained as to the quantity of fluid, its freedom or limitation by cysts or adhesions, and its consistence. It must be borne in mind that a relaxed or very fat condition of the abdominal walls may give rise to a sensation simulating fluctuation.

V. AUSCULTATION.—This is not nearly so useful a mode of examination in connection with the abdomen as the chest, and it need scarcely be mentioned that the intervention of a stethoscope is always advisable when practising it. It generally only gives negative information, except in cases of pregnancy, but sometimes by its aid certain positive signs are detected, viz.:—1. Friction-sound or grating, heard during the act of breathing, and due to exudation on the peritoneum, or to roughness of the surface of certain organs. 2. Murmurs in connection with aneurism, with regard to which it is requisite to notice their site, intensity, extent of conduction, synchronism, pitch, and other characters; as well as any effects produced upon them by pressure or change of position. 3. A murmur over the aorta or one of the common iliac arteries, due to pressure, such as that of a tumour. 4. Unusual conduction of the heart sounds over the abdomen. 5. Sounds due to the movement of flatus in the intestines; or to the falling of food or liquid into the stomach. 6. Fluctuation or splashing-sound, elicited by shaking the patient, and indicating the presence of both air and fluid. 7. Murmurs and sounds heard in connection with the pregnant uterus.

In the majority of cases the methods of examination thus far considered are sufficient for establishing a diagnosis; but there are others which might be called for in doubtful cases, and from which much aid may be derived. At present it must suffice to enumerate them, as illustrations of their usefulness will be given hereafter.

VI. EXAMINATION DIRECTED TO THE ALIMENTARY CANAL.—This includes:—1. The passage of a probang into the stomach, the end being felt through the abdominal walls, which helps in making out dilatation of this organ. 2. Examination of materials discharged from the stomach, and it has even been recommended to make use of the stomach-pump, and thus obtain some of the contents at different stages of digestion. 3. The use of purgatives and enemata, in order to clear out the bowels, which should never be neglected in doubtful cases, the effects being noted; or the injection of a quantity of water or gas per anum. 4. Examination of the anus and rectum, by inspection, the speculum being employed if required; by the finger or hand; or by the bougie. 5. Examination of the stools.

VII. EXAMINATION PER VAGINAM, as described in obstetric works.

VIII. EXAMINATION OF THE BLADDER AND URINE.—The use of the catheter must always be thought of when there is any reason to suspect an accumulation of urine in the bladder. It may also be requisite to sound this organ. In all cases it is absolutely necessary to examine the urine carefully.

KPLORATORY PUNCTURE WITH A SMALL TROCHAR OR THE ASPI- -This is done for the purpose of determining the presence and fluid within the abdomen.

MINISTRATION OF CHLOROFORM.—This may be required in aid in carrying out other modes of examination; and it at rmines the nature of the so-called "phantom-tumour" of the

l examination of the abdomen aids chiefly in investigating the ibnormal conditions:—1. General enlargements. 2. General or depression. 3. Local enlargements or so-called "tumours." ition in the size of organs; as well as certain changes in their iaracters, either with or without alteration in dimensions, *e.g.*, f the liver. 5. Pulsation unassociated with any change in size. 6. Interference with the abdominal respiratory move- 1 various causes.

and *local abdominal enlargements* are of very common occur- therefore, although involving some repetition, it may perhaps ce to indicate specially the course of investigation to be pur- the points to be observed in conducting a physical examina- he view of arriving at a diagnosis as to the cause of any such it.

al enlargements.—1. Examine as to the state of the abdominal nspection and palpation, paying particular attention to the of the umbilicus. 2. Ascertain the degree of enlargement act form, by inspection, palpation, and measurement. 3. xtent of the abdominal respiratory movements by the same nd whether they give rise to any sensation of fremitus. 4. : thoroughly over every part of the abdomen, in order to the sensations conveyed as to smoothness and regularity, resistance, consistence, gurgling, &c. 5. Observe specially any feeling of fluctuation, as well as its seat, extent, and roduction. 6. Percuss carefully, noting the sounds elicited domen in different parts, and the sensations conveyed to the ng the act. Sometimes it is requisite to examine for hydatid- 7. Apply the stethoscope, chiefly to ascertain whether any ids are heard during the act of breathing; if there are any of usually observed in connection with a pregnant uterus; or a rmur over either iliac artery. 8. Having examined thus far nt is lying in the ordinary position, it is then necessary to effects of various changes of posture, especially as regards f the abdomen; the percussion-sounds; and any fluctuation e present. 9. If after this a satisfactory diagnosis cannot will be requisite to have recourse to the other methods of mentioned, particularly examination by the rectum or the employment of the aspirateur or exploratory trochar. e urine should always be thoroughly tested.

enlargements.—Manipulation is by far the most important mination which can be employed in the investigation of lominal tumours, and therefore it is specially necessary to sense of touch for these cases. 1. Any local change in iited œdema; or enlargement of veins must be noted. 2.

A cursory examination is desirable, in order to determine if the
one tumour or more; and in the latter case whether they are
or connected. The further remarks will apply to each enlar
should there be more than one. 3. Ascertain the precise situ
the tumour, paying particular attention to the following poi
Whether it extends into the pelvis. *b*. If it is median, or occu
or other side, and to what extent. *c*. If it can be traced wi
margin of the thorax; and if it enlarges its lower part or alters t
costal spaces in any way. *d*. Whether it corresponds to, or
made out to be part of, either of the organs. *e*. Its depth, wl
lies in the abdominal walls; within the cavity near the surface;
down near the spine. 4. Mark out the dimensions and shape
as possible, observing the form of the margin; if this is well
fined; and if the outline corresponds to that of any abdomin
5. Feel carefully over the surface and margins to determine
they are smooth, granular, nodular, or lobular, noticing the c
of any prominences which may exist; and at the same time try t
the consistence, which may be more or less hard and firm
doughy, fluctuating, &c. It is important to observe whether tl
tions are uniform or not over the enlargement; and if any c
produced by pressure and manipulation, or any gurgling or g
thus elicited. 6. Ascertain whether the tumour is movable or
well as the degree of mobility, both by manipulation and under
ence of the respiratory movements. 7. Should there be any
or thrill, the exact seat and characters of each must be noted.
cussion is, of course, most valuable in bringing out sounds ar
sensations, and in many cases the precise limits and characte
enlargement can only be made out in this way. It is imp
notice whether the results of percussion are uniform over tl
surface or not. 9. Auscultation is sometimes useful, especially
to investigate murmurs, which may be associated with the tumo
or be the consequence of its pressure upon an artery. 10. Th
must be altered, as in the case of general enlargements, and tl
observed, as regards the site of the tumour; its percussion s
any changes affecting fluctuation, pulsation, or murmur, should
these be present. 11. Without again recapitulating the more
methods of examination, it may be stated that either or all of tl
be called for in doubtful cases, and under any circumstances it
desirable that the bowels should be thoroughly emptied by t
purgatives and enemata, as collections of fæces may cau
obscurity, and not uncommonly simulate tumours of a ver
nature.

ɔʏ.—Peritonitis may be divided into certain varieties, according
ode of causation, viz. :—1. *Traumatic.* This form may arise from
ternal injury to the abdomen; penetrating wounds; or rupture
nce of internal organs. It must be remarked, however, that the
of peritonitis from direct injury has been much exaggerated, as
nbrane is often considerably injured in operations without any
ar harm resulting. 2. *Perforative.* The special causes of this
nt variety of peritonitis will be separately considered. 3. *Irri-*
In not a few instances peritonitis arises from some local irrita-
ing then either limited, or spreading throughout the sac. Thus
e associated with diseases of organs; hernia or intestinal ob-
ı; ulceration of the bowels; morbid deposits; inflammation
cess of the lacteal glands; or it may be the result of extension
mmation through the diaphragm from the pleura or pericar-
The source of local irritation may be very obscure, requiring
arefully sought after. 4. *Secondary,* from blood-poisoning.
tis from this cause is especially important in connection with
peral state and Bright's disease. It may also be met with in
rse of small-pox, typhoid fever, pyæmia, erysipelas, glanders,
eumatic fever, and other diseases. In some of these cases it
ı supposed to be metastatic. 5. *Idiopathic.* Under this head
ıded those cases which cannot be traced to either class of causes
ly mentioned, but which are attributed to cold, over-eating or
, and other injurious influences. Many doubt the existence of
ety, but exceptional cases come under observation which cer-
em to come fairly under this class. 6. *Puerperal peritonitis*
ably be conveyed by contagion.

posing causes. Children are only very rarely attacked with acute
eritonitis, and in them it is usually associated with some exan-
ıs fever. Certain forms of blood-poisoning, but especially that
ith renal disease are very favourable to peritonitis from

presents a greasy aspect. The effusion is as a rule comparatively sm in quantity, and the explanation of this may be that the intestines generally so distended with gas that they prevent much accumulation fluid. This fluid is always more or less flaky and turbid, and not commonly presents an almost purulent appearance, occasionally be actually purulent, especially in puerperal and other low forms of peri nitis. Sometimes there is an admixture of blood. Much fœtid gas frequently present in the peritoneal sac, and in certain cases forei materials. Gangrene is occasionally observed. The morbid produ of peritonitis are in some instances of the most virulently septic cha racter, and the introduction of the minutest quantity into the system highly dangerous; hence special care should always be taken in conducting a post-mortem examination in these cases.

According to the extent of the inflammation peritonitis is named *general* or *local*, the former term merely indicating that it is extensive, for the entire surface is but rarely involved. The local varieties are named according to the part affected, such as parietal, hepatic, omental, or nephritic.

Should recovery take place, thickenings, agglutinations, and bands of adhesion form, which subsequently may prove highly dangerous.

SYMPTOMS. — Peritonitis presents considerable variations in its clinical history, but it will be convenient first to consider a typical case, and then point out the principal forms which call for special notice.

The onset of the disease is usually definite and marked, being attended with distinct, often severe and repeated rigors. These are soon followed, sometimes accompanied, or rarely even preceded by local symptoms referable to the abdomen and its contents; with evidences of constitutional disturbance. Some of the main symptoms are due to the irritation of organs excited by the inflamed peritoneum; or to paralysis of the muscular coat of the hollow viscera, especially of the stomach and bowels.

Pain over the abdomen is in most cases a prominent symptom. It usually begins locally, especially below, but may ultimately extend over the entire surface, though it is frequently more marked in one region. Its intensity and characters vary much, but it is generally very severe, sometimes agonising; and hot, burning, shooting, or darting in character. Any disturbance of the parts increases it considerably, as by change of posture, a deep breath, coughing, vomiting, defæcation, or even the movement of flatus in the intestines. There is extreme tenderness, especially on making deep and limited pressure, but in some cases even the weight of the bed-clothes cannot be borne. The alimentary canal is gravely affected, as evidenced by a very small, irritable, red tongue, slightly furred, and tending to dryness; complete loss of appetite, with great thirst; nausea and vomiting of everything swallowed; and absolute constipation.

The appearance of the patient is often highly characteristic. The face, pale or flushed, presents an expression of evident suffering and grave constitutional disorder combined with anxiety, the features being drawn and pinched. There is much prostration, with general uneasiness and restlessness, but though the arms may be thrown about, the patient he body perfectly still, on account of the pain which movement and instinctively assumes a characteristic posture, with the view xing the abdominal muscles, viz., lying on the back, with the nd shoulders raised, and the knees drawn up.

xia is usually, but not always, present to a very marked degree ; here is no regularity in the temperature. The pulse is increased in ncy, ranging from 100 to 150 or more, small, sharp, often hard ry or thready ; in bad cases it tends to become extremely frequent, and irregular. The blood is, in many cases, highly hyperinotic. ation is hurried but shallow ; persistent hiccup causes much dis- n some cases. The urine is markedly febrile, and not uncom- contains albumen. It may be almost suppressed or retained. ition is sometimes very frequent. As a rule no particular cere- mptoms are observed, except headache and sleeplessness ; in bad however, low muttering delirium may set in, or in puerperal peri- this is sometimes of a wild type.

sical examination of the abdomen reveals some important signs, 1. Tympanitic distension, often extreme. 2. Absolute cessation abdominal respiratory movements. 3. Occasionally friction-fre- r sound, if the patient can be made to breathe deeply, especially e liver, due to the presence of lymph. 4. Usually signs of a amount of fluid, viz., dulness in dependent parts, with in some es a sense of fluctuation, movable with change of posture.

RSE AND TERMINATIONS.—Peritonitis is a very fatal disease, death usually preceded by extreme prostration and collapse, as indicated aspect of the features ; cold, clammy sweats ; coldness of the ities ; and an extremely rapid, feeble, and irregular pulse. The n the abdomen often ceases, sometimes suddenly, and the tym- may disappear. Sometimes large quantities of a dark fluid ing altered blood are expelled from the stomach and bowels t any effort. Low nervous symptoms usually set in, but the t may be clear almost to the last. Occasionally death seems to rom asphyxia or coma. Should recovery take place, there is a l subsidence of the symptoms, and among the chief signs of ement are a change in the expression ; increase in the force and of the pulse, with a more satisfactory sphygmographic tracing ; f constipation ; and increase in the quantity of urine. Peritonitis to terminate occasionally by crisis with critical discharges, but st be an extremely rare event.

IETIES.—The special forms of peritonitis requiring notice are as :—1. *Perforative*, which will be separately considered. 2. *Latent*. are sometimes observed in which there is extensive peritonitis any symptoms at all ; or none of any definite character. This due to the mental condition of the patient, but not always. A ible illustration of this variety came under my care at University l, in which there were absolutely no signs of peritonitis, and yet the only lesion found after death. 3. *Adynamic*. Here there d tendency towards the typhoid condition, with a dry and brown sordes on the teeth, and low nervous symptoms. 4. *Erysipela-* uerperal peritonitis is the best illustration of this form, in which mmation is very extensive, intense, and rapid in its progress, the products being remarkably non-plastic, consisting chiefly o lent-looking fluid, often very abundant. The· symptoms ar tionately severe, and of a low type. It is also observed after l sometimes, and in pyæmia. 5. *Local.* When peritonitis is li or more marked over, some particular organ, the pain may be and symptoms connected with this special organ become pr When the parietal peritoneum or great omentum is involved, severe superficial pain, with marked tenderness. 6. The sympton tonitis may be modified by complications. Of these the most i is enteritis, which may give rise to diarrhœa instead of constipa

DIAGNOSIS.—It is important to bear in mind the possibility nitis being latent, should there be any condition present likely nate this disease. The principal affections from which it h distinguished are cramp or colic; muscular rheumatism of the al walls; enteritis; enteralgia and other neuralgic pains within the a the passage of a gall-stone; and certain cases of hysteria, atten tympanitis and other local symptoms closely simulating pe The diagnosis is founded on:—1. The history of the case, a exciting cause and mode of onset. 2. The aspect of the patien usually suggests grave constitutional disturbance in peritonit there is no evidence of hysteria. 3. The posture of the pati state of absolute rest as regards the body. 4. Local sympto cially the severity and characters of the pain; marked tenderne is not merely superficial but also deep; vomiting; and con 5. Physical signs, as evidencing great tympanitis, with some fl possibly the presence of lymph. 6. The existence of more pyrexia, often accompanied with special characters of the pulse and urine.

PROGNOSIS.—Peritonitis is always a highly dangerous affectio gravity differs materially according to its cause. Perforative p is extremely fatal; and next in order come puerperal peritor those cases associated with pyæmia and other forms of blood-p Traumatic and local varieties are much less serious. Low sy are unfavourable; and the condition of the pulse, especially as by the sphygmograph, will assist in determining the prognos duration of fatal cases may vary from 24 or 48 hours to 3 or they do not often extend beyond a week.

TREATMENT.—No exact rules for the treatment of peritoniti laid down, as this has to be materially modified in different cas will be only practicable to indicate the general principles which followed, and the main remedies for carrying them out. It premised that any cause which is setting up or intensifying p must be at once removed if possible, and should be carefully s in doubtful cases, as for instance an intestinal hernia. The m ciples of treatment are:—1. To procure rest for the affect 2. To subdue the inflammation and aid in the removal of th matory products. 3. To sustain the strength of the patient treat various symptoms.

The removal of blood by venesection, or by the application number of leeches over the abdomen, is a measure which is v monly adopted in the treatment of peritonitis, and certainly it ystem, if the patient is weak, either constitutionally or from -existing illness; or if the inflammatory process is far advanced, cidedly injurious to take away any blood. The balance of evi- opposed to bleeding in puerperal peritonitis. The application es is much preferable to venesection, the number employed from 10 to 20, 30, or even more in appropriate cases. Mer- tion, by means of calomel administered with opium, is another mon mode of treatment, but it appears to me to be as useless ous in this as in other serous inflammations.

is a remedy of the utmost importance. It not only relieves s, especially pain and vomiting, but also prevents the peristaltic the bowels, and thus contributes greatly to the maintenance of is best given in the form of pill, gr. ½—ij, repeated every two, four hours according to circumstances. If there is renal pium can only be employed very cautiously. Morphia, either red as a pill, gr. ¼—½; or by subcutaneous injection, is also luable in some cases. Where the stomach is extremely irritable of opium may be introduced by enema. Other anodynes may when opium is inadmissible. Quinine in full doses has been nded, and in low forms of peritonitis it might probably be red with much advantage along with opium.

iet requires the most careful attention. Only liquids should cool or even cold, and they must be administered in small and uantities at stated intervals. Frequently abundant nutriment d, especially milk and well-made beef-tea. In many instances olic stimulants are needed, and in low cases these are the only on which reliance can be placed. The sucking of ice is highly mended; or small quantities of iced drinks might be allowed. cases it is requisite to have recourse to nutrient enemata, when the stomach is very irritable.

applications over the abdomen are of decided value. The hot linseed-meal poultices, not too heavy, sprinkled over with

enemata of opium. Dyspnœa is usually relieved by re
panitic condition. Adynamic symptoms require amm
turpentine internally; along with abundance of alcohol
nutritious liquid food.

II. Chronic Peritonitis.

Etiology.—Chronic peritonitis is observed:—1. A
one or more acute attacks. 2. After repeated parace
3. In connection with chronic diseases of organs, suc
cancer of the liver, chronic ulcer of the stomach or in
sociated with some diathesis, especially when this leads
mation in the peritoneum, as of cancer or tubercle, but c
may also arise from Bright's disease, and possibly from

Anatomical Characters.—These necessarily vary
general way they may be said to be thickening of
sometimes to an extreme degree; adhesions, in the f
extensive matting together of the organs; accumulatio
fluid, which ranges from mere serum to actual pus, or
of blood, and is often confined in loculi limited by th
some cases large masses of organised lymph are seen
ment is often present. Caseous degeneration may ha
parts; or cancer or tubercle may be evident.

Symptoms.—In some cases there are no clinical evi
peritonitis, or only such as are very obscure; in other
signs are observed. When present the symptoms inc
jective sensations in the abdomen; disturbance of the
sometimes evidences of pressure; with generally m
stitutional disorder. Uneasiness or more or less actu
rienced, never severe, liable to come and go, often colic
by shaking the body. Sometimes there is a sense of
Tenderness is common, being frequently more mark

cal examination often yields important information. 1. The
n is enlarged, and this may be the first thing which has attracted
ent's attention. The enlargement is never very great; usually
but not always quite symmetrical. 2. The sensations are
uniform over the entire surface. Fluctuation may be detected
, but only indistinctly; while it is often very limited, or is felt in
situations, owing to the fluid being enclosed in locular spaces.
regions there may be a more firm and solid sensation, or even
may be detected sometimes. The abdomen may be moveable
iole. 3. Dulness is frequently very extensive, owing to the ar-
nt of the fluid, and may lie chiefly in front. In some instances
tic and dull sounds are heard over contiguous and irregular
There may be a sense of much resistance on percussion. 4.
-fremitus and sound can sometimes be detected. 5. Change of
frequently does not produce much effect, on account of the fluid
culated.

TMENT.—The main indication in most cases is to treat the con-
al state with which chronic peritonitis is associated, by means of
r oil, tonics, mild ferruginous preparations, light nutritious diet,
le climate, and proper hygienic conditions. Iodide of potassium
e of iron may be tried internally, with the view of removing the
atory products, as well as local counter-irritation over the abdo-
pecially by iodine liniment or ointment. This region should be
with cotton-wool and well bandaged. I have known consider-
efit follow in simple cases from systematic pressure by bandaging
lomen. Pain and constipation must be relieved by the usual
but caution must be exercised in giving opium, and also in ad-
ing strong purgatives. Hot-air or vapour-baths are useful if the
um contains much fluid.

III. Morbid Growths in the Peritoneum.

nost important of these are tubercle and cancer. Hydatids are
ally found, and very rarely other tumours. The folds of the
um, especially the omentum, frequently enclose a great quantity

rcle occurs in the peritoneum, either over limited patches cor-
ing to intestinal ulcers; as a part of acute miliary tuberculosis;
sively, secondary to tubercle in other parts.

er is met with in the form of scirrhus, encephaloid, or colloid,
ntum being a comparatively frequent seat of the last-mentioned.
the peritoneum is involved secondarily by extension from one
rgans, but in rare instances it is affected primarily and solely.

morbid growths tend to produce ascites or chronic peritonitis,
is to these conditions that their local symptoms are mainly due.
nes fluid collects with extreme rapidity in cancer. Colloid in
entum yields the following physical signs:—1. The enlargement
abdomen may be very great, but is wanting in uniformity; the
is appears stretched, but not everted. 2. Firm irregular masses
erally be felt, and even if fluid is present, fluctuation is very in-
3. Dulness is usually elicited over the front of the abdomen.

4. Change of posture produces no effect, unless there is much fluid present. 5. The aspirateur or exploratory trochar may bring away a slimy gelatinous fluid; and this is occasionally discharged by vomiting or per rectum.

IV. Abdominal Perforations and Ruptures.

Apart from the effects of traumatic injury, perforations and ruptures are liable to take place in connection with the abdominal contents, and in order to avoid repetition it will be convenient to indicate the chief facts pertaining to this subject in the present chapter, as the peritoneum so commonly suffers in these cases.

Etiology and Pathology.—The principal structures which are liable to give way, and the pathological conditions which cause these lesions, may be thus stated:—1. Perforation of the stomach or intestines from within in connection with ulceration or the resulting cicatrices; gangrene; cancer; the action of corrosive poisons, especially on the stomach; or mechanical irritation and destruction, particularly by foreign bodies introduced from without, but sometimes merely by hardened fæces, worms, or gall-stones. It must be mentioned that extensive *post-mortem* softening and destruction of the coats of the stomach may, under certain circumstances, result from the action of the gastric juice. 2. Rupture of an abscess or hydatid cyst in the liver. 3. Perforation of the gall-bladder, either by gall-stones which have caused ulceration; or from cancer. 4. Rupture of the spleen, from extreme enlargement and softening; or abscess. 5. Various ruptures in connection with the uterus and ovaries. 6. Bursting of any accumulation in the pelvis of the kidney; of an abscess or cyst in this organ; or of the bladder from over-distension. 7. Bursting of an abscess unconnected with any organ; or of a soft morbid accumulation in the glands. 8. Rupture of an aneurism. 9. Perforation of a hollow viscus from without, owing to the destruction of its coats by some solid tumour. 10. Bursting of a peritoneal accumulation. 11. Very rarely perforation of the diaphragm with escape of some fluid collection in the chest into the abdominal cavity.

These lesions usually occur without any immediate *exciting cause*, but certain of them may be brought on by some mechanical disturbance, such as vomiting, coughing, or laughing; straining at stool; or, in the case of ulceration of the alimentary canal, by taking excess of or irritating articles of food, or such as cause flatulent distension.

The perforation or rupture may take place into different parts, and the pathological and clinical consequences will vary accordingly. 1. Most frequently the opening communicates with the peritoneum, into which foreign matters are poured more or less freely, exciting *perforative peritonitis*, severe and rapid in proportion to the quantity and irritant nature of the materials thus introduced into the sac. 2. Sometimes the subperitoneal cellular tissue is the structure affected, local inflammation ending in abscesses being set up there. 3. Not uncommonly one hollow organ forms an adhesion with another, and when perforation occurs a communication is established between them; or the adhesion may be with a solid organ, and when perforation is completed, this may

) for the deficiency. 4. Union may be set up with the abdo- ıll, the opening being consequently on the external surface.

OMS.—From the facts just stated it will be evident that the ıs indicating perforation must differ considerably, and there may at all, or death may be almost instantaneous, as from rupture eurism. As a rule there have been previous evidences of some ondition in connection with which the lesion occurs. Presuming sudden and of any extent, and that the communication takes to the peritoneal cavity, this is usually indicated by a sudden pain at the seat of rupture, often of a burning character, which rapidly over the abdomen, being sometimes attended with a s if something were pouring out; at the same time there are nary signs of more or less collapse or shock, and death may ensue from this cause. Should the patient rally, peritonitis will dily set up, the peculiar features of which are that the local as precede any rigors; that the pain starts from a certain spot; course is usually very rapid; and the termination almost always f the perforation takes place into the cellular tissue, there will be local inflammation followed by abscess, with general pyrexia. ıcks of pain and collapse may be repeated, this probably indi- xtension of the perforation, or the formation of fresh communi-

TMENT.—In any case of perforation the patient must be kept ly at rest, and this applies still more emphatically to the organ the seat of the lesion. In the case of the stomach or bowels, ould be complete abstinence from food by the mouth, and only emata administered. Opium is the great remedy for the pur- counteracting shock, relieving pain, and checking peristaltic It should be given in full doses, at short intervals. Collapse lso be treated by free administration of stimulants, which, if the ary canal is affected, must be given by enemata; heat to the ties; and sinapisms. Hot fomentations may be applied over omen. Should peritonitis or other inflammation be set up, the eatment must be adopted. After perforation of the stomach and es, it is extremely important to avoid giving anything by the mouth e time; and to refrain from any attempt to act upon the bowels ients.

V. ASCITES.—DROPSY OF THE PERITONEUM.

LOGY.—Ascites is merely a localised dropsy of the peritoneum, ıy be the result of:—1. Pressure upon the branches of the portal ithin the liver, especially from cirrhosis and other forms of contraction of the liver; or infiltrated cancer. 2. Pressure upon rtal trunk in the fissure outside the liver. It is from this cause cites is most frequently associated with many diseases of the liver, s cancer, albuminoid disease, hydatids, or abscess; either projec- om the liver pressing on the vein, or the glands in the fissure simultaneously affected. Inflammatory thickening from peri- is; any tumour in the vicinity; or an aneurism may also cause re. 3. Internal obstruction of the portal vein by a thrombus.

4. Pressure upon the inferior vena cava, after it receives the hepatic trunk. 5. Cardiac diseases obstructing the venous circulation, these in time giving rise to organic changes in the liver. 6. Renal disease. 7. Morbid deposits in the peritoneum, which are supposed to act by inducing active congestion, but which probably chiefly originate dropsy by pressure upon the small vessels. 8. Exposure to cold; suppression of discharges or chronic skin diseases; and other causes which may lead to internal active congestion. The reality of this class of causes is questionable, but cases of ascites have been attributed to them.

Anatomical Characters.—The quantity of dropsical fluid which may collect in the peritoneum varies extremely, often amounting to several gallons; it distends and macerates the tissues in proportion to its amount. In characters it is usually in the main watery in consistence; clear and transparent; colourless or faintly yellow; alkaline in reaction, or very rarely neutral or acid. It may be turbid, dirty-looking, or stained by bile or blood, gelatinous, or mixed with soft fibrinous masses. Its composition is far from being uniform, but generally it contains much albumen; occasionally it yields fibrin, urea, or cholesterin.

Symptoms.—The only symptoms directly due to ascites are those dependent upon the mechanical effects of the fluid. There is more or less discomfort and sense of fulness in proportion to its quantity. Digestive disturbances are common, flatulence and constipation being prominent symptoms: sometimes vomiting takes place. Owing to the interference with the diaphragm, dyspnœa is complained of and may be urgent, being much increased often by flatulence. The heart's action may also be disturbed, as evidenced by palpitation, irregularity, or sometimes a tendency to syncope. Anasarca of the legs frequently follows ascites, resulting from pressure by the fluid on the vena cava, which also leads to enlargement of the veins of the abdominal wall. When caused by pressure on the vena cava, of course anasarca of the legs is observed simultaneously with or even before the ascites. Albuminuria may be induced by pressure on the renal veins.

Physical Signs.—These require careful consideration, and in the majority of cases they are sufficiently characteristic, but they necessarily depend upon the quantity of fluid present. 1. The skin usually appears stretched to a variable degree, smooth, and shining, feeling thin; the superficial veins are often enlarged; and the umbilicus is stretched, everted or pouched out, and becomes finally obliterated. 2. The abdomen is more or less enlarged, in some cases enormously; quite symmetrical; and of a rounded form, though it tends to bulge in the flanks or in the hypogastric and iliac regions, according to the position of the patient; the greatest circumference is about the level of the umbilicus, which is the highest point of the abdomen; the thorax appears small and depressed, and its lower margin may be everted or the ensiform cartilage bent sharply up. Usually a history can be obtained that the enlargement commenced below; and that it increased steadily, though slowly in most cases. 3. Abdominal respiratory movements are frequently either deficient or absent. 4. The surface feels quite regular and uniform; and fluctuation is generally readily elicited from side to side. 5. Dulness is observed first towards the lumbar regions, if the patient lies in the supine position; then in the lower part of the abdomen; and

by degrees towards the front and upwards, until finally it may
ed all over the abdomen. The umbilical region retains the
sound longest, and it is often excessive here. When the
s up, the prominence between the recti becomes tympanitic.
tation is negative. 7. Change of posture gives important
the fluid can occasionally be seen moving; the form of the
is altered, bulging being observed in the most dependent part;
seat of dulness and fluctuation is changed. 8. Examination
a reveals the sensation of the resistance of fluid. 9. Exami-
vaginam indicates that the vagina is short, and the uterus
wn or flexed. 10. Any fluid removed usually consists of mere
ntaining generally a considerable amount of albumen. 11. The
r be displaced upwards and to the left, occasionally a basic
eing thus originated.

ısis.—There are two points in the diagnosis of ascites, viz.:—1.
nine whether fluid is present; and to distinguish enlargement
is cause from that dependent upon other morbid conditions.
ke out its pathological cause. The chief general abdominal en-
s which may simulate ascites are those associated with great
ith much fat in the omentum; a flabby relaxed state of the
h flatulence; considerable subcutaneous œdema; peritonitis,
chronic; colloid in the omentum; a greatly dilated stomach;
n tumour; distension of the uterus with fluid, or pregnancy;
nely distended bladder; a large hydatid tumour in connection
liver or any other structure; an enormous cyst in the kidney;
ntom tumour.

y *physical examination* that ascites is mainly distinguished
conditions just enumerated, but it is important to observe that
ry signs may be modified or obscured by some of them; by
tion with a tumour, morbid deposit, or enlarged organ; by the
g either very small in quantity, or on the other hand extremely
; by the mesentery being so short as not to allow the intestines
orward; and by the existence of adhesions limiting the fluid.
ites is associated with any solid enlargement, the latter may
be recognised by making sudden firm pressure with the
y which the fluid is pushed aside and the firm mass reached;
btful cases the fluid can be removed, and satisfactory examina-
carried out.

ant aid in the diagnosis may also be derived from:—1. A careful
story of the case; and the conditions of the patient with respect
d general appearance. 2. The history of the enlargement, as
r it has been more or less acute or chronic in its progress, and
t has fluctuated or steadily progressed; as well as its seat of
d direction of increase. 3. The accompanying symptoms;
ondition of the main organs, which should all be thoroughly
. 4. The results of treatment, not forgetting the use of the aspi-
trochar; of the catheter; and of means for clearing out the
canal.

ıaracters of most of the enlargements mentioned above are
in other parts of this work, to which descriptions reference
made for individual diagnosis. It is necessary, however, to

point out specially the characters distinguishing cystic tumour of the ovary from ascites. 1. *Physical signs.* (i.) The umbilicus is often thinned and flattened out, but not everted or pouched out. (ii.) The enlargement is not so globular in shape; projects anteriorly; does not bulge in dependent parts; and is frequently not quite symmetrical, this being accurately determined by semi-circular measurements, or by comparing the distance from the umbilicus to the anterior superior iliac spine on each side. The greatest circumference is said to be about an inch below the umbilicus, in the recumbent posture; and the measurement from the ensiform cartilage to the umbilicus is generally shortened. (iii.) As a rule fluctuation is indistinct; the enlargement feels more or less firm and resistant or even nodulated; while the sensations are not uniform over the entire surface. Frequently, on deep pressure greater resistance or tension is felt on one side than the other. (iv.) Percussion reveals dulness chiefly in front of the abdomen, even in the umbilical region, while the flanks are tympanitic, and the dulness often extends more towards one side than the other. The prominence between the recti in the sitting posture is dull. There is usually a sense of considerable resistance on percussion. (v.) Auscultation may detect a pressure-murmur over one iliac artery. (vi.) Change of posture does not produce the alterations observed in ascites. (vii.) Examination per rectum detects a firm resistance. (viii.) The vagina is long and narrow above, the uterus being raised. (ix.) An exploratory trochar may bring away a thick, glutinous, or coloured fluid, which sometimes contains cholesterine; and after this has been removed solid portions of the tumour may be felt more readily. 2. There is no history of any cause, or evidence of any organic disease likely to originate ascites. 3. Frequently the patient has observed that the enlargement commenced below, and from one side. 4. Symptoms which often accompany ascites are absent; while anasarca of the legs is commonly an early symptom of ovarian tumour, owing to pressure on the veins, which may be entirely or chiefly confined to one side.

With regard to the diagnosis of the cause of ascites, this can generally be made out by satisfactory examination as regards history, symptoms, and physical signs, directed to the liver, heart, and kidneys; the distinctive characters referable to the ascites itself are pointed out in the chapter on Dropsy. Obscure causes can only be determined by exclusion, and by a thorough consideration of all the circumstances of the individual case.

TREATMENT.—In addition to the ordinary measures adopted in the treatment of dropsy, there are two which demand special notice in connection with ascites, viz., paracentesis, and the employment of pressure. It has been the custom to look upon paracentesis as an operation which should only be performed as a last resource, when the fluid has collected to such a degree as to cause urgent symptoms. When the ascites is a part of general dropsy from cardiac or renal disease, the amount of fluid is not often so great as to need its removal by operation, nor could this serve any beneficial purpose, except in affording temporary relief. The last remark applies also to many cases in which it is merely a local dropsy; but there is one class of cases in which paracentesis may not uncommonly be performed as a curative measure, so far as the ascites

med, viz., when it is dependent upon cirrhosis of the liver. In
es I have for some time had recourse to repeated paracentesis
tematic method of treatment, the fluid being taken away again
n should it re-accumulate, and the results have been most satis-
lue care being of course exercised in the performance of the
ı, and in the subsequent management of the case. I have pub-
me observations on this subject in the *Practitioner*, and since
ral other cases have been under my care, in which this treat-
proved highly successful. Other observers have also recorded
e results from this operation, and therefore it appears to me
: to insist upon the employment of paracentesis abdominis as
of cure in connection with ascites from uncomplicated cirrhosis
er, should the fluid be at all abundant and show no signs of
ıoved by other treatment. I am aware that cases have been
in which recovery has followed merely general tonic and other
treatment, but this is such a rare event that sole reliance
: placed on these remedies, though they aid materially the
by operation. This may also be assisted by pressure, the
being tightly bound by a broad roller as soon as all danger of
itation has ceased, from which much benefit often results. I
that never has any injurious consequence followed the opera-
n my experience, and in some almost hopeless cases permanent
has been brought about. The employment of poultices of
eaves along with pressure has appeared to do good in some

CHAPTER XXXI.

EASES OF THE STOMACH AND INTESTINES.

. CHARACTERS.—Symptoms referable to the alimentary canal are of
on occurrence, that it has rightly become a matter of routine in the ex-
f a patient to make enquiry concerning them. The succeeding general
ndicate the clinical phenomena which may be met with, and the course
d in their investigation :—
l sensations are very commonly experienced over some part of the abdo-
incpal being pain or tenderness; heat or burning in the epigastrium; a
king, dragging, or tightness; discomfort, weight, and fulness after food,
her hand a feeling of emptiness even after a full meal, with constant crav-
: and abnormal movements within the abdomen. *Cardialgia* or *heart-burn*
plied to a peculiar sensation of heat or burning in the epigastrium, which
ards, as if along the œsophagus, to the throat; or in some cases spreads
s over the chest. With regard to pain, it is very important not only to
: carefully in all the usual particulars, but also in many cases to ascertain
in what way it is influenced by food or drink in general, or by special
liet; by vomiting or eructation; defæcation or the passage of flatus;
novement; coughing or deep inspiration; mental disturbance; or, in
nces, by the periods of menstruation. In determining whether there is
: is well to take off the patient's attention, and its site and extent, degree,
it depth must be made out as accurately as possible, while it must be
er it appears to be connected with any evident morbid condition, such
. These remarks apply to all kinds of abdominal pain or tenderness

When the stomach is affected, uncomfortable or painful sensations are often re to the back between the shoulders; or to the front of the chest.

2. The sensations as regards inclination for food and drink are often al Appetite may be deficient or lost (*anorexia*), in some cases the feeling amounti a complete disgust for food; excessive, both as to quantity and frequency (bul attended with a desire or dislike for special articles; or altogether depraved. is a frequent symptom, and there may be a particular inclination for certain on the other hand an antipathy to fluids is sometimes observed.

3. The process of digestion is frequently interfered with. Hence decompo fermentation is set up in the contents of the alimentary canal, leading to the tion of gases; occasionally of alcohol; various acids (lactic, butyric, acetic or vegetable growths (*sarcinæ ventriculi* and *torulæ*). Great discomfort may t from flatulent distension, gurgling (*borborygmi*), or acidity.

4. Acts are excited in connection with the stomach with the view of offending materials, viz., vomiting and retching, which may or may not be with a feeling of nausea; regurgitation of food; or eructation of gases, liq other substances. With regard to the mechanism of these acts, vomiting is attended with contraction of the muscular coat of the stomach, but also of minal and thoracic muscles, while the cardiac end of the œsophagus is retching is the same act, but ineffectual, only air being expelled, either be stomach is empty, or because the lower portion of the œsophagus is spas closed. Regurgitation and eructation are merely due to contraction of the and some individuals can regurgitate their food at will. In infants the vom pears to be much of this character. A special form of eructation or regurgi been named *pyrosis* or *water-brash*, in which, often after painful sensati epigastrium, especially a sense of burning, a quantity of clear watery fluid the mouth, generally tasteless and neutral, but in some cases sour or acrid in reaction. This fluid has been supposed by some to be mainly saliv have considered it to be pancreatic juice; but probably most of it comes stomach.

5. Blood may be poured out into the alimentary canal, and either rejected stomach (*hæmatemesis*); or passed by the bowels (*melæna*).

6. The bowels are very commonly irregular in their action, either in the of *constipation* or *diarrhœa*. It is frequently desirable to make particular en this matter, as patients offer general statements which may easily mislead. points to be ascertained are the frequency of the act of defæcation; whethe by any straining; whether any unusual sensations precede, accompany, or and the quantity and characters of the materials discharged. In many case perative to make a personal examination of the stools, noticing their amount general appearance; consistence; the form and size of any solid fæces; there are any signs of fermentation or aëration; general composition, the m be specially looked for, in addition to ordinary fæces, being various article either unaltered or more or less digested; foreign bodies introduced from calculi, especially hepatic; intestinal worms or hydatids; blood or alter mucus or pus; fatty matter; fibrinous flocculi or casts; epithelial shreds; animal, or mineral poisons; or, rarely, sloughs or portions of the intestin sionally a chemical and microscopic examination is necessary, especial detection of poisons and parasites, or even merely to determine the composi fæces.

7. The tongue gives important information as to the state of the digesti the particulars to be noted being:—*a.* Its size and shape, and whether it by the teeth. *b.* The colour of its mucous covering, especially at the tip *c.* Its condition as to dryness or moistness. *d.* The state of the surface, wheth glazed, fissured, furrowed, &c. *e.* The size, shape, and colour of the vario *f.* The presence, extent, and characters of any fur over the dorsum. It m mentioned also that the mouth and throat are frequently affected when the out of order; while a slimy or otherwise disagreeable taste is experience breath has an unpleasant odour.

8. In some cases abnormal sensations are experienced about the lower rectum and anus, such as pain, either constant, or before, during, or after defæcation; fullness, weight, heat or burning, constriction, dragging, or fre nation to go to stool, with straining. Some of these are included unde *tenesmus*. Hæmorrhoids are frequently present also.

l harsh skin, or on the other hand a depression of temperature, with cold ex-
s and sweats ; nervous symptoms, viz., congestive or neuralgic headache or a
of weight and oppression in the head, giddiness, irritability and petulance, de-
of spirits and apathy, inaptitude for any mental effort, confusion of ideas and
intellectual vigour, hypochondriasis, wakefulness or drowsiness with restless
efreshing sleep attended with disagreeable dreams, timidity and nervousness,
the limbs and back, chilliness or even rigors, especially in the evenings,
; sensations over the body, or convulsions in children ; disturbance of the
ction, in the way of palpitation or irregularity, feebleness, sometimes accom-
with faintness or actual syncope, as well as uncomfortable sensations in the
region, the pulse being weak ; dyspnœa, hiccup, or asthmatic attacks ; op-
across the chest and cough ; changes in the urine, especially indicated by
f lithates or sometimes of phosphates or oxalates, excess or deficiency in
and deficiency in chlorides ; menstrual derangements ; and skin eruptions,
rticaria, herpes, and psoriasis. It must be remarked that a tumour or solid
ition in connection with the stomach or intestines may press on neighbouring
s, and thus originate symptoms.

CHAPTER XXXII.

ERTAIN GASTRIC SYMPTOMS AND FUNCTIONAL DISORDERS.

chapter the chief symptoms and functional affections con-
with the stomach will be considered ; the diagnosis, prognosis,
tment of the more chronic complaints will, however, be referred
subsequent general chapter on this subject.

I. GASTRODYNIA—GASTRALGIA.

OGY.—These terms indicate a painful neuralgic affection of the
, chiefly met with among females, especially about the time of
or when the menstrual functions are declining. The conditions

in severity and characters, usually paroxysmal, and coming on either at regular or irregular intervals, though in many cases there is never complete relief. During the paroxysms the suffering may be extreme, especially in hysteria and gout. Food frequently gives decided relief, the pain returning as the stomach becomes empty. Sometimes indigestible substances afford more ease than those which are digestible and soothing. Some patients, however, suffer intensely when they take anything, or after particular articles, such as hot tea. Pressure generally relieves, especially when made firmly and continuously, but there may be much superficial tenderness. Various curious sensations are often complained of in the epigastrium. During the severe attacks of pain, spasmodic movements of the stomach and bowels may be observed, with cramps of the abdominal muscles. Dyspeptic symptoms are habitually present in most cases, such as acid and gaseous eructations, flatulency, heart-burn, or pyrosis. The tongue may be fairly natural. In hysterical cases chronic vomiting is sometimes a very distressing symptom; and not uncommonly a morbid craving exists for improper and indigestible articles of food. The bowels are generally very constipated. Frequently other nervous disturbances are observed. In some instances there is considerable emaciation, especially if food is not taken; but it is remarkable what a slight degree of wasting may attend the chronic vomiting of hysteria. Aortic pulsation is often present.

II. SPASM OR CRAMP OF THE STOMACH.

ETIOLOGY.—This differs from gastralgia in being an acute affection, and attended with spasmodic contraction of the walls of the stomach, which may be excited by indigestible or irritating food or drink, or in some individuals by special articles of diet ordinarily quite harmless; drinking excess of cold water, or indulging too freely in ices, especially when the stomach is empty; acrid secretions in the stomach; flatulent distension; mental emotion; and gout.

SYMPTOMS.—There is intense pain, which comes on suddenly in a series of paroxysms with remissions, being of a griping, constrictive, or twisting character. It is most marked near the pylorus, but may be felt running across the epigastrium, or even up along the œsophagus. Pressure gives marked relief, the patient sitting up and making firm pressure over the stomach, lying upon it, or tossing and rolling about. Often a feeling of sickness is experienced, and the pain may be eased by vomiting. More or less prostration is frequently observed, and occasionally even severe collapse, with cold and clammy sweats, a very feeble and slow pulse, and fluttering of the heart, which condition may actually terminate in death. Sometimes the spasmodic movements of the stomach can be felt externally. If they continue for some time, a little soreness and tenderness remain, but these sensations soon pass off.

TREATMENT.—Should there be any irritating materials in the stomach, an emetic of sulphate of zinc or mustard, with plenty of luke-warm water, should be given immediately. Spirits of ammonia, spirits of chloroform, tincture of opium, with some carminative, will generally relieve the pain. If there is acidity, carbonate of soda or magnesia may be also administered. A little brandy or gin with hot water is often

n; or by a direct disturbance of the brain, affecting the stomach
the vagus nerves. Its numerous causes may be classed thus :—
e immediately acting upon the stomach, viz., irritating materials
terior, whether introduced from without or formed there : organic
of its coats ; obstruction at the pyloric orifice ; external pressure
e organ : and displacements, *e.g.*, hernia through the diaphragm.
x irritation from other sources, particularly the throat ; intestines
worms) ; peritoneum ; female genital organs (especially in con-
with pregnancy) ; and testicles. Reflex vomiting also accom-
he passage of a gall-stone or renal calculus, as well as other
its attended with severe pain. It may arise in susceptible per-
n any unpleasant smell, taste, or sight ; or even from a sudden
he vomiting which follows severe fits of coughing, especially in
comes under this head. 3. Centric or cerebral vomiting. The
ses coming within this group are injury to or disease of the brain
embranes, especially meningitis ; cerebral anæmia or conges-
oisoned state of the blood, the poison being either introduced
hout (*e.g.*, alcohol and its products, tobacco, tartar-emetic, chlo-
pium and its constituents, lobelia), or being generated within the
in various febrile disorders, especially at the outset, uræmia, or
inhalation of a hot and tainted atmosphere ; mere nervous shock
; hysteria and other so-called functional nervous derangements,
ting being then probably the result of disordered circulation ;
imagination of unpleasant things. With regard to sea-sickness
r allied forms of vomiting, such as that brought on by swinging,
tainly come mainly within this class, but several theories have
oposed to explain the occurrence of this symptom under these
ances. The peculiar movements, the appearance of objects in
and the unpleasant odours and sights usually present probably all
ducing sea-sickness, though some authorities regard it as entirely
peculiar disturbance of the cerebral circulation. Vomiting is a
nt symptom in migraine or sick-headache. Morning sickness is
ociated with chronic alcoholism, being partly the result of the

vomiting, and how soon it follows the introduction of the ex materials; in connection with some obvious reflex or centric ca such as cough, irritation in the throat, severe pain, a bad smell or t smoking, drinking, or mental disturbance; in certain positions or change of posture. It must not be forgotten that many poisons ca vomiting, and suspicious cases might come under observation nee complete and cautious investigation as to substances which had b taken, or some of these might even be required for chemical ex nation. 3. The sensations preceding and accompanying the a especially noting if there is any feeling of nausea, as well as its deg giddiness; prostration; or pain. 4. The manner in which the act performed, this being determined by personal inspection if poss especially remarking if it appears to be originated voluntarily; a whether it is performed easily or with more or less straining and retc-ing. 5. The after-effects, particularly as regards the relief of gastric pa or its intensification; and the influence upon cerebral symptoms. I may be mentioned here that the mere violence of vomiting may occasion serious lesions, such as rupture of the stomach or a vessel, apoplexy, or hernia, and it often leaves a sense of soreness over the abdomen. 6 Examination of the vomited matters. This is of the utmost importance and ought never to be neglected, and the same remark applies to materials discharged by regurgitation or eructation, or brought up by the stomach-pump. The chief points to be noticed are:—*a*. The quantity rejected. *b*. The taste as perceived by the patient. *c*. Odour. *d*. General physical characters as to colour, and as to the materials of which the vomited matters consist, whether of different kinds of food, unaltered or in various stages of digestion, decomposition, or fermentation; unusual substances introduced from without; blood or altered blood; gastric juice; watery fluid; mucus; biliary matters; fæces; morbid products, such as calculi, worms, hydatids, portions of growths, or pus. It is also desirable to observe whether the vomit is frothy or yeasty-looking. *e*. Chemical characters. The reaction should always be taken; and in certain cases it may be desirable to make a chemical analysis, in order to determine the presence of products of fermentation, gases, bile, sugar, urinary compounds, inorganic or organic poisons. Of course in any case of suspected poisoning a complete analysis must be performed. *f*. Microscopic characters. The chief materials to be looked for are blood-corpuscles, pus-cells, cancer-cells, echinococci sarcinæ or torulæ. The microscope is also of use in detecting certai poisonous substances. *Sarcinæ* are vegetable growths, and appear a little oblong rectangular bodies, in shape resembling minute wool-pack being divided into four equal parts by cross lines which correspond t dissepiments, these being again subdivided by fainter lines, so that in a they make 64, each ultimate particle consisting of an elementary squa cell. Sarcinæ are only found in acid vomit, which usually presents wel marked signs of having undergone fermentation, and they are mo frequently observed in connection with pyloric obstruction.

DIAGNOSIS.—By attention to the particulars just considered, aided b the history of the case, and the other symptoms present, the cause any vomiting may generally be satisfactorily made out. It is requisit however, to point out the chief distinctions between *cerebral* and *gastr*

1. Nausea usually precedes and attends the latter; but is
t in the case of the former. 2. The accompanying symptoms
case point chiefly to the alimentary canal, especially to the
ı the other to the brain, head-symptoms being prominent.
of vomiting generally relieves any nausea, giddiness, or head-
may precede it, when it is gastric in origin; such is not the
rebral vomiting.

NT.—Vomiting occurs under such a variety of circumstances,
ore can be done here than to indicate the general principles
its treatment should be conducted. 1. The cause must be
and removed if possible. Thus an emetic is not uncom-
of the best remedies, in order to clear out the stomach of
ers. Any reflex excitement must also be subdued. Patients
old to aid voluntarily in suppressing vomiting as much as
nd warned against bringing it on by coughing or any such
ention to diet is all-important. By withdrawing food alto-
ınly giving very small quantities of cool liquids, especially
me-water or soda-water, or brandy with weak beef-tea or
ckness may often be effectually stopped. It is particularly
enquire into the feeding of children, as vomiting in these
o commonly due merely to errors in this respect. 3. It may
attend to certain general matters, such as position, rest, and
ion. Especially is this the case with regard to cerebral
d sea-sickness, against which absolute rest in the horizontal
h plenty of fresh air, may afford some protection. Pressure
f a girdle across the abdomen has been recommended to
sickness. 4. The chief direct remedies for the relief of vomit-
sucking of small lumps of ice; effervescent draughts with
acid, or the latter with mucilage; iced champage or brandy
ıter; opium, either in pill, as the tincture or liquor opii along
remedies, or in an enema with starch; morphia in pill, by
injection, or sprinkled on a blistered surface over the
; chloroform; creosote in drop doses in the form of pill;
acid, sulphite of soda, or hyposulphites, should the vomiting
vegetable growths, or carbolic acid under the same circum-
x vomica or minute doses of strychnia, the last-mentioned
ıderfully efficacious in some instances after all other remedies
Bismuth, magnesia, and carbonate of soda are also valuable
: conditions. Dr. Ringer recommends in many forms of
op doses of vin: ipecac: every hour or three times a day
o circumstances; in others he finds arsenic useful. It is
make all draughts as small and agreeable to the taste as

applications to the epigastrium are sometimes beneficial,
napisms, blisters, cold by means of the ice-bag, and friction
orm or belladonna liniment.

IV. HÆMATEMESIS.

.—Blood may find its way into the stomach under a variety
nces. As a rule it comes from the vessels of this organ,

being usually capillary in its origin, but sometimes due to the erosion of a large vessel; it may, however, be derived from other sources. The causes of hæmatemesis may be thus classified:—1. Traumatic, from external violence over the epigastrium. 2. Diseased conditions of the blood, especially in yellow fever. 3. Vicarious, particularly in connection with deficient menstruation. 4. Injury by foreign bodies or destructive chemical agents which have gained access into the stomach. 5. Abnormal conditions affecting the stomach itself. Thus hæmorrhage may be the result of violent vomiting and retching; congestion from any cause; inflammation; ulceration; cancer; or rarely atheroma of the vessels, embolism or thrombosis, or varicose veins. 6. Diseases of other organs and structures, especially those in the vicinity of the stomach. These chiefly act by inducing extreme mechanical congestion, which may follow any great obstruction of the portal circulation, but especially that due to cirrhosis of the liver, thrombosis of the portal vein or its branches, pressure upon the portal trunk or vena cava inferior, and long-continued cardiac and pulmonary affections. Acute atrophy of the liver is often attended with hæmatemesis, which is then partly due to the state of the blood. Splenic disease may cause it in both ways. Sometimes a neighbouring disease, *e.g.*, cancer of the pancreas, destroys the coats of the stomach and thus opens its vessels. Occasionally an abdominal or thoracic aneurism bursts into this organ. It is stated that an omental hernia may drag it downwards, and thus lacerate the mucous membrane. 7. It must not be forgotten that blood may be swallowed, either coming from the œsophagus, mouth, throat, nose, or respiratory organs. The blood of animals also is actually purposely swallowed sometimes, either by hysterical girls or for purposes of deception.

Symptoms.—Hæmorrhage into the stomach may not be attended with any external indications, either because the blood is poured out so abundantly as to kill instantly; or on the other hand because it is in very small quantity. In the majority of cases, but not always, there is either some obvious cause of the hæmorrhage; or it is preceded by symptoms referable to the stomach, or by signs of organic disease in its vicinity. Usually the blood is rejected, either by a mere act of regurgitation; or in most cases by more or less violent vomiting, though it must be remembered that this act may be the cause of the bleeding. The quantity of blood discharged necessarily varies much, and it is generally more or less mixed with food and other materials. Its characters are in the majority of cases very distinctive, it being non-aërated; brown or black in colour; grumous, often resembling "coffee-grounds," soot, or tar; and acid in reaction. Should the blood be coagulated, the clots are broken up, irregular, firm, and heavy. On microscopic examination the red corpuscles are seen to be much altered in shape or destroyed, and pigment granules are abundant. Most of these characters depend upon the action of the gastric juice on the blood. If the blood is discharged immediately or soon after its escape into the stomach, it may be quite bright and unaltered, or only slightly changed. Commonly some of it passes on into the bowels, giving rise to tarry stools. The general symptoms indicating loss of blood will of course be present in proportion to the extent of the hæmorrhage.

the lungs. 3. The mode of discharge of the blood, whether ing or vomiting. It must be remembered, however, that may be excited by the cough in hæmoptysis; or some of the y be swallowed and afterwards rejected from the stomach. aracters of the blood, as already described, with reference to ration, general aspect, reaction, and microscopic appearances. noptysis some blood usually continues to be discharged in the tion for a certain time after the main bulk has been expelled; not the case in hæmatemesis. 6. Along with hæmatemesis od is usually seen in the stools. 7. Careful physical examina- often reveal some organic cause likely to give rise to pulmo- stric hæmorrhage; and in connection with the former there *iles* indicating the presence of blood in the bronchial tubes. rds the cause of hæmatemesis, this can only be made out by a consideration of the case in all its details. Blood coming e may be usually detected by local examination of the throat It is necessary to warn against mistaking the colour due to e or iron for that of blood.

IENT.—The principles of treatment are the same as for other ges. In addition to bodily rest, the stomach must be kept in absolute repose in severe cases, nutriment being administered ema; in less dangerous cases very small quantities of cool ing alone permitted. The patient should swallow small lumps intervals. The most efficient medicines are gallic acid or lead in full doses combined with opium; or oil of turpentine. e applied carefully over the epigastrium. It is very important any violent efforts at vomiting by means of hydrocyanic acid ilage; morphia internally or by subcutaneous injection; or an ntaining tincture of opium; at the same time a sinapism being ver the epigastrium. In cases of capillary hæmorrhage de- on congestion from portal obstruction, a saline purgative is an aperient enema. Should stimulants be required on account e, they are best administered by injection. Vicarious hæmor- st be treated according to the ordinary principles events no obvious organic disease can be detected, and it is to this class of cases that the terms are often limited; the same symptoms, however, are commonly associated with different forms of organic mischief, and in the subsequent remarks on this subject it will be impossible to avoid alluding to these.

The causes of dyspepsia in general may be grouped under certain heads, viz.:—1. Disorders connected with the diet, viz., excessive eating; too rapid eating; insufficient mastication and ensalivation, this being especially associated with the habit of "bolting" food, or being due to absence or irregularity of teeth, particularly in old people; irregularity in meals, or their being taken too frequently or the reverse; and improper quality of food. The last may depend upon the nature of the food itself; the manner in which it is cooked; or upon its having undergone fermentation or decomposition. Liquids not uncommonly cause indigestion, and special mention must be made of the habit of drinking large quantities of cold water or other drink with meals, by which the gastric juice is much diluted; of excessive indulgence in tea, or sometimes coffee; and abuse of alcohol, particularly when spirits are taken at frequent intervals, strong and undiluted. Injudicious use of sharp condiments with food sometimes originates dyspepsia. Idiosyncrasy causes some individuals to suffer after special articles of diet which are usually easily digestible, such as milk or eggs. 2. Alterations in the gastric juice. This secretion may be in excess; deficient, even to complete suppression; or of morbid quality. The principal changes in quality are excess of acid; deficiency of acid, pepsine, or both; admixture with abundant mucus secreted by the stomach, which may even render the gastric juice alkaline; and the addition of abnormal ingredients. These alterations result from:—*a*. Organic affections of the stomach, especially mechanical congestion; inflammation; degeneration and atrophy of the secreting glands; degeneration of the vessels; ulceration; and cancer. *b*. Morbid conditions of the blood, as in renal disease, diabetes, pyrexial conditions, gout, anæmia. *c*. General want of tone and debility. *d*. Nervous disturbance. 3. Changes affecting the movements of the stomach. The expulsive power of the stomach may be interfered with, in consequence of want of muscular or nervous tone, dilatation, or pyloric obstruction; or the movements are irregular; or the food passes out too soon, before it is properly digested, either in consequence of undue excitability of the stomach, or of imperfection in the pyloric valve. It is by influencing the secretory and motor functions of the stomach that many of the ordinary causes aid in inducing dyspepsia, such as sedentary habits; undue exertion either just before or after a meal; habitual constipation; abuse of narcotics, tobacco, tea, or alcohol; excessive study, emotional disturbance, or any form of mental shock; venereal excesses. Most important is it to bear in mind also that dyspeptic symptoms may be entirely due to disease of some other organ than the stomach; and in any case not yielding to treatment, the condition of the principal organs should be ascertained.

SYMPTOMS.—In the first instance it will be well to give a general outline of the clinical phenomena which are, in different combinations, observed in cases of dyspepsia; and then to indicate the characters of the main varieties.

which it produces, or they are soon satisfied. Thirst is generally
but may be a prominent symptom. From the decomposition
nentation of food result flatulent distension, with a sense of
nd weight in the epigastrium ; acidity ; heart-burn ; and eructa-
t is very important to ascertain the characters of the eructa-
They consist of gases, various liquids, and undigested food.
s are either tasteless and odourless, resulting from fermenta-
have some peculiar smell and taste, of which the chief are
mbling fish or rotten eggs, both being associated with deficiency
of secretion, and the last being due to decomposition of food
ormation of hydric sulphide. The principal liquid eructations
atery fluid of pyrosis ; and matters having an acid, rancid, or
te. Acid eructations indicate either that excess of gastric
ormed ; or more commonly that the contents of the stomach
ergone acid fermentation : butyric acid imparts the rancid
. Bitter eructations probably contain bile. Nausea is felt in
es, but vomiting is not a frequent symptom, though some
ndeavour to excite it after taking food, in order to relieve their
t. The bowels are usually disturbed in their functions, as in-
y constipation, or in some instances by diarrhœa ; colicky
tulence and borborygmi ; and the passage of fœtid gas. The
outh, and throat are generally in an abnormal state, but they
fferent appearances in the different varieties of indigestion.
h is also frequently offensive.

neral and other symptoms previously described as being asso-
h disorders of the alimentary canal are present in variable
ons.

IES.—I. ACUTE DYSPEPSIA.—This may come on in an indi-
itually quite free from dyspeptic symptoms ; or be merely an
on of a previously existing morbid state. It is difficult to
precisely what the morbid condition is in many cases of
epsia, but unquestionably in a good number of them there is
tarrh : while others are merely instances of migraine or so-

matters, such as mucus, acids, or bile, which affords relief; eructations of gases, either tasteless and odourless or like rotten eggs, as well as of acids; heart-burn; a large and moist tongue covered with a thick white or yellow fur, and sometimes presenting enlarged and red papillæ; disagreeable taste and breath; constipation usually, but occasionally diarrhoea with colicky pains. The general symptoms are usually very pronounced, and there is not uncommonly a sense of extreme illness and depression, with a certain degree of pyrexia, the skin being dry; herpes about the face or general urticaria may break out. The urine is generally concentrated and deposits lithates; occasionally there is slight albuminuria. In infants there may be high fever or convulsions. Probably many of the cases of so-called "gastric remittent fever" in these subjects are merely instances of acute dyspepsia with febrile symptoms assuming a remittent type.

The *treatment* of this complaint is similar to that of the slighter cases of gastric catarrh, which will be presently described. It is important to remove speedily all irritant matters by means of emetics, aperients, or enemata.

II. CHRONIC DYSPEPSIA.—1. ATONIC.—Most of the ordinary cases of dyspepsia belong to this variety, being associated with general debility; anæmia; want of tone in the coats of the stomach; or sometimes degeneration of the peptic glands. The gastric juice is deficient and muscular activity impaired. The sensations in the epigastrium are mainly those of weight, fulness, and discomfort after food, without actual pain or tenderness, pressure often affording relief. Not uncommonly there is in the intervals a constant sense of sinking in the epigastrium. Occasionally œsophagismus is experienced. There is a disinclination for food, and not unfrequently for drink. Digestion is much delayed, and a quantity of foul gas is formed, as well as acids and rancid matters, there being hence much flatulence, with various eructations. The tongue is large and marked with the teeth, pale, flabby, moist, and usually more or less furred. The mouth and throat are also often pallid, flabby, and relaxed; and the breath is very disagreeable. As a rule there is habitual and obstinate constipation, the stools being firm, pale, deficient in bile, and offensive. The general symptoms are well-marked usually, the pulse being feeble, wanting in tone, and easily hurried; the skin cool, soft, and clammy, with a tendency to coldness of the feet and hands; and the urine often abundant and watery. The nervous symptoms incline chiefly to languor, apathy, and indisposition for any effort. Oppression across the chest, shortness of breath, cough, and palpitation, are often complained of.

2. IRRITATIVE.—Probably in the form of dyspepsia thus named, a condition of chronic gastritis is present to a greater or less degree. Actual pain or a sense of burning is experienced in the epigastrium, increased by food, and generally accompanied with a little tenderness. Heart-burn and acidity are also common symptoms. Appetite is impaired, but thirst is usually felt, especially for cool drinks. Occasionally vomiting takes place. Eructations are frequent, but are not fœtid as a rule. The tongue tends to be contracted and red, especially at the tip and edges with enlarged papillæ; it may be furred or clean. The throat also is frequently in an irritable condition, being reddened and granular

metimes presenting follicular ulcers. Though constipation is the from time to time diarrhœa with colicky pains is apt to set in. The tends to be hot and dry, the palms and soles having a burning tion; and sometimes a cutaneous eruption breaks out. The pulse uent. The urine is often concentrated and deficient in quantity, iting lithates on standing. The nervous disturbance is chiefly in lirection of irritability and petulance, with restlessness. There e considerable emaciation.

NERVOUS.—A variety of dyspepsia has been described by this in which the prominent symptom is pain after food, supposed to ociated with hyper-secretion, and observed chiefly in young women. ms to be merely a form of gastralgia; and may exist alone or ated with other kinds of dyspepsia.

One form of indigestion deserves special notice, which is by no uncommonly met with, especially in out-patient hospital practice, ich there is an excellent appetite, and no particularly unpleasant ions are felt after food, but almost as soon as it is taken it seems s out of the stomach, owing to an irritable condition of this organ; rapidly traverses the intestines, giving rise to borborygmi and y pains; and is speedily followed by diarrhœa, the stools consistiefly of undigested food. Hence there is a constant craving for and a sense of considerable exhaustion or prostration is often ienced after the passage of a stool. In some instances this course ents only occurs the first thing in the morning; in others it follows meal, and may thus cause serious loss of flesh. In some cases my care the symptoms have been apparently due to the habit of sive smoking; or to over-indulgence in hot tea.

CHAPTER XXXIII.

ACUTE GASTRIC CATARRH—ACUTE GASTRITIS.

OGY.—1. The ordinary cause of acute inflammation of the stomach e direct irritation of its mucous surface, mechanical or chemical, roduced by food or drink, foreign bodies, or poisons. Food may inflammation in any of the ways mentioned under acute dyspepsia. in irritants require special notice, viz., very hot or cold substances; olic liquids, either taken in excess or insufficiently diluted; sharp ments; tartar emetic and arsenic. It must not be forgotten that st two have been frequently administered for poisoning purposes. rsenic may be inhaled from certain green papers used for papering . 2. More or less gastric catarrh is commonly present in the of the various exanthemata, cholera, and yellow fever; and somein diphtheria, pneumonia, puerperal fever, gout, rheumatism, and febrile diseases. 3. The membrane lining the stomach may be d, along with other mucous surfaces, as the result of "taking 4. Drinking a large quantity of cold water while the body is has been mentioned as a cause of gastric catarrh. 5. It is stated

cases of irritant poisoning, however, intense re
the entire surface, though generally more mark
Small extravasations are not uncommon. The
or opacity, with swelling and thickening of the
tion in consistence. Superficial erosions or
ulcers are visible in many cases. In except
inflammation is very intense, sloughs form, or su
submucous tissue. Very rarely croupous or d
been observed. The secreting structures und
The cells and nuclei of the tubuli become enl
numerous granules and fat-globules form, so
tended. The solitary and lenticular glands ar
Gastric juice is not properly secreted, but the
thick ropy mucus, alkaline in reaction, and co
of young cells. Between the glands also the
cells, the lymphatic tissue being increased.

It will be readily understood that the appear
ing to the intensity and cause of the inflamm
result of poisoning it often presents special ch
the poisonous substance may be observed, or
coats of the stomach may take place. For a des
ances reference must be made to toxicological

SYMPTOMS.—The circumstances just alluded
influence the intensity of the symptoms, these b

Local.—Pain over the epigastrium is almost
very intense. In characters it is often hot and
different directions, especially towards the bac
is merely a sense of aching and soreness, or
These sensations are increased by food, the act
inspiration. Vomiting often relieves them, but

The mouth is slimy, and an unpleasant taste is experienced.
ion or diarrhœa may be present, according to the state of the
. The lips are sometimes the seat of herpes.

l.—In some forms of gastritis premonitory symptoms are
such as chills or slight rigors, feverishness, and general malaise.
ie attack pyrexia is frequently present, though seldom to a
legree, except in children, with restlessness, headache, nervous
ı, and sleeplessness. In severe cases, especially when the
ion is the result of poisoning, there is often great prostration
se, with a cold and clammy skin, pinched and anxious features.
y rapid, weak, and small pulse. Hiccup is sometimes a most
ne symptom, and the breathing may be much hurried.

sis.—The symptoms above described, if present to any
egree, are quite characteristic of gastritis; but in mild cases,
astric catarrh occurs as a complication of fevers, it may be
o diagnose this affection positively. The tongue often gives
lications under these circumstances. When there is much
onstituting the so-called "gastric fever," typhoid fever may be
at first.

sis.—Generally this is favourable, except when the gastritis
sult of poisoning, or when it assumes a severe character.
s weak persons, very old or young individuals, or those suffer-
cute febrile diseases. In some cases the complaint tends to
ronic.

ENT.—1. If there is anything in the stomach causing irrita-
irst thing to be done is to get rid of this by means of an emetic
te of zinc, mustard, or ipecacuanha, with plenty of luke-warm
by the stomach-pump, if necessary. A purgative at the out-
n useful, such as a dose of calomel followed by a black draught,
or a draught containing sulphate and carbonate of magnesia;
cases an enema may be advantageously employed. It is
objectionable to administer purgatives repeatedly, but, if neces-
nema may be given from time to time.

patient should be kept quiet in bed, and it is most important
he stomach to remain in a state of rest, either complete or
cording to the severity of the disease. In dangerous cases no
ld be taken by the mouth, but nutrient enemata administered
If food is permitted, it must be entirely of a liquid character.
ickened with some farinaceous substance, and given in small
at regular intervals. Milk diluted with lime-water or soda-
mixed with a little arrow-root or corn-flour, weak beef-tea,
or chicken-broth are the most suitable articles of diet. The
ust be prevented from drinking large quantities of water, which
much craved for, but may suck small lumps of ice at frequent
and this gives much relief. As a rule stimulants are not
but sometimes brandy in small doses well-diluted or mixed
-water, milk, or beef-tea seems to be decidedly beneficial; or
ampagne with soda-water. Should there be much prostration,
ble quantities of alcoholic stimulants may be called for, and if
ch will not bear them they must be administered by enema.

prominent symptoms are most effectually alleviated by the administration of antacids and sedatives. Among the most serviceable remedies may be mentioned a combination of bismuth with hydrocyanic acid and opium; iced effervescent draughts containing carbonate of ammonia, potash, or soda with hydrocyanic acid and tincture of cardamoms; solid opium, gr. ½—ij, or, better still, morphia, gr. ⅛—¼ j.; hydrocyanic acid (♏ iij—v), with a little mucilage; magnesia and the alkalies, alone or in combination with the other remedies. Either of these should be given at intervals of from two to four hours, according to circumstances, and it is desirable to make the quantity of the medicine as small as possible. The alternation of effervescents with an opium or morphia pill is frequently attended with the best results. In treating children of course due caution must be exercised in employing the powerful drugs mentioned.

4. Lcoal Treatment.—In cases of severe gastritis it might be advisable to apply a few leeches to the epigastrium, but venesection is never required. The constant application of heat and moisture over the abdomen by means of poultices, fomentations, or spongiopiline is highly beneficial. Cold is employed by some practitioners. Sinapisms are sometimes of use, but more severe forms of counter-irritation are of doubtful efficacy. When gastritis arises from retrocedent gout, an attempt should be made to excite inflammation in the joints.

5. Much care is needed during convalescence as regards diet, hygienic management, and medicinal treatment. Various remedies employed in the more chronic complaints, which will be hereafter considered, are useful if given with care, such as the vegetable bitters, alkalies, acids, pepsine, and preparations of iron. The state of the bowels must be attended to, and mild purgatives given if required. Vichy and Seltzer waters are often beneficial.

CHAPTER XXXIV.

CHRONIC DISEASES OF THE STOMACH.

I. CHRONIC GASTRITIS—CHRONIC GASTRIC CATARRH.

ETIOLOGY.—In its more or less chronic form gastric catarrh is met with:—1. Occasionally as the remains of an acute attack. 2. As the result of constant or repeated irritation of the stomach, particularly by indigestible food, tea, alcohol, purgatives, stimulant and bitter medicines, hot condiments, and arsenic. 3. In connection with chronic organic diseases of the stomach, especially cancer, ulceration, and albuminoid disease. 4. From interference with the portal circulation, which leads to persistent mechanical congestion of the stomach. 5. Associated with constitutional disorders, particularly phthisis, renal disease, gout, syphilis, or any low general condition of the system.

ANATOMICAL CHARACTERS.—The colour of the mucous lining is changed, there being increased vascularity, and the vessels may be permanently distended; frequently, especially if there has been mechanical con-

ll, portions of the surface are seen to be grey, slate-coloured,
lack from altered blood-pigment. Small hæmorrhagic ero-
t uncommon. The surface is often covered with a thick
cus. One of the most important changes is a thickening
rane, accompanied with increased firmness and toughness,
marked that it has a leathery feel, although there may be
time slight superficial softening. More or less opacity is
, some spots appearing quite opaque and white from fatty
Mammillation is a common appearance near the pylorus.
changes which occur have been described by Wilson Fox,
dfield Jones, and others, as an increase in the interstitial
ing the lymphatic elements; distension of the solitary
tions in the gland structures here and there, in the way
eration and destruction of their epithelium, thickening of
ne, contraction and puckering, formation of minute cysts,
ometimes fatty degeneration of the entire membrane in
ng the small vessels. The mammillation may be due to
glands; or to contraction of the muscular fibres which
l.

—The symptoms referable to the alimentary canal which
racteristic of chronic gastritis are considerable uneasiness
ach, amounting in some cases to actual pain, though
generally increased soon after meals, especially after taking
articles; a certain degree of tenderness; a sense of heat
sometimes extending over the chest; frequent heartburn,
and acid or gaseous eructations; impaired appetite, the
soon satisfied, though there may be a feeling of empti-
ging for food; thirst, especially for cool drinks, often par-
ed between meals and in the evenings; a small, bright-
ng, and sore tongue, with enlarged and red papillæ, or the
alone, there being usually more or less fur as well, though
the tongue seems abnormally clean; an irritable or catar-
of the lips, mouth, and throat, sometimes with aphthæ or
ration; hot and disagreeable breath; intestinal disturb-
n the way of constipation with pale and dry stools, or of
lienteric stools, flatulence, and colicky pains. There is
g of sickness, but actual vomiting is only common in cer-
gastric catarrh, viz., when it is associated with chronic
nal disease, or portal congestion, sickness being then fre-
minent symptom in the mornings and after meals. In
large amount of alkaline mucus is brought up, when the
med *gastrorrhœa.*

l system suffers more or less as a rule, there being the
s and reflex symptoms previously described, often accom-
ss of flesh and debility; sallowness or slight jaundice; a
especially in the evenings and after food or stimulants,
d harsh skin, a sense of burning in the palms and soles,
f the face. The urine is frequently disordered, depositing
ntly, or in some cases phosphates or oxalates. Cutaneous
not uncommon. Sometimes signs of premature decay

II. Ulcer of the Stomach.

Some writers describe all ulcerations of the stomach under one others distinguish two chief forms, viz., the *perforating*, character its tendency to perforation; and the *chronic*, which is attende much thickening of tissues.

Etiology.—On the whole females are more subject to gast than males. It is most common between 18 and 25 or 30 age; and in advanced life. The perforating ulcer is most fre young females; the chronic in old males. Among the immediat of gastric ulceration have been mentioned intemperance, ba mental anxiety, tuberculosis, various lowering diseases, disc menstruation, suppression of hæmorrhoidal flux, pregnancy, an of cutaneous ulcers. Much doubt exists, however, on this mat

Anatomical Characters.—The *perforating ulcer* or, acc some, the *early stage of ulceration*, may be seen in various destruction of the coats of the stomach, beginning with the membrane and extending towards the peritoneum. Its edges and clean cut, as if punched out, without any thickening, an subsequent coat is destroyed over a smaller area than that abo ulcer has a somewhat conical shape, the apex being next the pe and the margin of each layer being well-defined. The floor i but may be sloughy or covered with extravasated blood.

After the *chronic ulcer* has existed for some time, its margins become greatly thickened and indurated by the formation of a and granular substance, which subsequently developes into fibrous tissue. The different layers become matted togeth variable extent, but the ulcer remains distinctly conical or funn the mucous membrane being inverted. Granulations are seen on its surface. It is important to notice that in this co the ulcer firm adhesions tend to form between the stomach bouring organs, by which the evils of perforation are prevent

The superficial form of gastric ulcer is usually circular first, but it may become irregular from extension or from the c of two or more. The size generally varies from ½ inch to 1 in diameter, but the length may reach 5 or 6 inches. Usua only one ulcer, but two or more are sometimes found, or c former ulcers may be observed. The most frequent seats of are the posterior surface, the neighbourhood of the smalle and near the pylorus; it is rare on the anterior surface, near curvature, or at the cardiac end. Chronic ulcer is most freq vicinity of the pylorus.

The mucous membrane around the ulcer may be healthy, signs of hæmorrhages and extravasations, polypoid vegetatio chronic catarrh.

Cicatrisation frequently occurs, generally by granulatio cicatrix may either be smooth or puckered, or give rise to mu ing, contraction, and alteration in the form of the stomach stricture, especially at the pyloric end, with various distor Sometimes an ulcer does not completely cicatrise; or it h spot and extends at another.

ation is very liable to happen if there is no thickening or adhe-
cially when the ulcer is in a position where it is subject to
turbance by movement and distension of the stomach, and
lesions cannot easily form, as in the anterior wall and near the
rvature. The peritoneum forms a small slough, and then
by a little sharply-defined or slightly torn opening. If adhe-
formed, the coats may be destroyed completely, and ulti-
n considerable portions of contiguous organs. In some cases
ted peritoneum is distended in the form of a pouch.

ogy.—Gastric ulcer is considered by most authorities to
an interference with the supply of blood to a portion of the
embrane, the vitality of which is thus impaired, so that it
on by the gastric juice and destroyed, the deeper tissues
equently attacked in the same way. This may result from
extravasation into the tissues of the stomach; embolism;
n or narrowing of the arteries; or rarely submucous sup-
Some pathologists regard all ulcers as being the result of
n.

s.—Occasionally gastric ulcer is unattended with any charac-
ptoms, until revealed by some serious event, such as per-
the opening of a large vessel. In many instances they are
ut ill-defined and obscure, especially in the chronic form of
The clinical phenomena which are suggestive of ulcer may
mmarised:—Severe localised pain in the epigastrium, of
awing, or burning character, or attended with a feeling of
d prostration, persistent but increased after food, especially
n articles, such as hot tea; local tenderness on pressure;
articularly after taking anything, not attended with much
retching as a rule, and generally affording relief to the pain,
d matters sometimes containing sarcinæ ventriculi, or frag-
he stomach-tissues; hæmatemesis, either due to capillary
of the opening of a large vessel, and generally followed by
arious dyspeptic symptoms, such as flatulence, eructations,
ranged appetite, and constipation or occasional diarrhœa;
or less general wasting and debility, which may be accom-
a dull, earthy, cachectic aspect, or in young females with
næmic or chlorotic tint; the menstrual functions being also
ch disturbed in these subjects.

re some points of importance which require comment. The
f the pain will vary with that of the ulcer, but it is most com-
le to the right of the epigastrium; if the ulcer is on the
rface it may be referred to the back on one side of the spine.
and posture often influence the degree of suffering, and it is
aggravated by mental emotion, or in females during the
periods. In the chronic form pressure not uncommonly gives
lief, and hence patients voluntarily press against the epigas-
casionally food also gives ease instead of increasing the pain.
is chiefly observed when an orifice or its vicinity is affected,
he pyloric. The interval which elapses between the taking
d any sickness or aggravation of suffering will often indicate
n of the ulcer: thus, if it is near the cardiac opening these

effects are produced immediately; if about the pylorus they only follow after some time. In some instances the pyloric orifice is permanently obstructed, and the stomach becomes consequently dilated, the signs of which will be presently indicated. No distinct tumour can ever be felt, but occasionally, when there is much thickening and induration about the pylorus, this can be made out by careful manipulation. The tongue is often abnormal, but has no special characters. Salivation is said to occur sometimes, the saliva being deficient in sulpho-cyanides.

The degree of the general symptoms will depend mainly on the amount of pain, interference with digestion and nutrition, and hæmorrhage. In exceptional instances of perforating ulcer pyrexia has been noticed.

The course and duration of cases of gastric ulcer are very variable. As a rule they are chronic, but occasionally the perforating variety appears to be rather acute in its progress. Many cases terminate in cicatrisation and recovery; but death is also a common event, occurring either suddenly or rapidly from perforation or hæmorrhage, or gradually from asthenia.

III. CANCER OF THE STOMACH.

ETIOLOGY.—Among general predisposing causes of gastric cancer age is the most important. The majority of cases occur between 50 and 60, but the complaint may be met with from 30 to 70, and, exceptionally, even beyond these extremes. The male sex; hereditary tendency; a high social position; and mental anxiety are also believed to predispose. As local causes have been mentioned long-continued pressure over the epigastrium; injury; and the repeated action of irritants upon the stomach, such as hot spices or strong spirits.

ANATOMICAL CHARACTERS.—All forms of cancer are met with in the stomach, but scirrhus is by far the most common. It is here, however, that the colloid variety is usually observed. The pyloric orifice and its vicinity is the part of the stomach generally involved, but the cardiac end, curvatures, fundus, or body may be attacked. The cancer may be very limited in extent, especially scirrhus; or widely spread, implicating a great portion of the walls, which is especially the case with colloid, and when the body of the stomach is affected. In some cases it passes from the stomach to the œsophagus, but shows no tendency to invade the duodenum. The submucous tissue is usually the primary seat of the deposit, and it subsequently involves the deeper coats and partially the mucous membrane. Colloid, however, according to Dr. W. Fox, seems to begin in the glandular structures. In most cases the morbid growth infiltrates the coats, but encephaloid cancer is prone to form nodular masses in the submucous tissue.

The actual characters of the cancerous part will necessarily vary with the nature and amount of deposit; in most instances it will be found hard, dense, thickened, contracted, and whitish on section, but each variety presents its own peculiar characters. Not unfrequently the mucous membrane becomes destroyed, and an ulcer forms, but there may be extensive cancer without any ulceration. The ulcer has thick ragged margins and an uneven floor, which presents cancerous masses. Adhesions often form with other organs, which may become involved by

ion; or occasionally perforation takes place into hollow viscera or
arts.

seat of the cancer influences much the shape and size of the
h and the condition of its walls. When it involves the pylorus
an becomes much dilated and its walls hypertrophied. On the
and it is contracted, shrunken, and small when the cardiac orifice
ed. If the middle of the body alone is implicated, the cavity
ly constricted at this part, so that the stomach assumes an hour-
m. Cancer along the curvatures distorts the stomach in various
its contraction, often drawing the orifices near together. In
stances the organ is displaced considerably, owing to a mass at
ric end having fallen by its own weight and become adherent in
normal position. Such a mass may press on various structures
lead to other morbid conditions, *e.g.*, on the portal vein, causing

or chronic gastritis and glandular degeneration are generally
to a greater or less extent.

r of the stomach is almost always primary, but it tends to
other abdominal organs and structures, either by extension
condary deposits, the latter being particularly common in the

oms.—For some time, and in some cases even to the last, the
s are merely those of dyspepsia, with wasting; or the disease
entirely latent. As a rule, however, there are prominent *local*
ral symptoms.

—Pain is generally present in some part of the epigastrium,
with the seat of the cancer, and though at first amounting
o a sense of weight and uneasiness, it usually becomes very in-
It may be continuous or intermittent, and is often paroxysmally
l. Food aggravates it as a rule, but not so distinctly as in
lcer, and it may be relieved by food. In character it is fre-
described as aching, burning, or gnawing, as well as lancinating,
towards the hypochondria, back, or shoulders.

erness is almost invariable, with a feeling of soreness, even
ere is no spontaneous pain, the slightest touch being some-
nbearable. This may be associated with some evident tumour
ening.

a and vomiting are rarely altogether absent, usually becoming
quent and distressing as the case progresses. Vomiting is par-
observed if the orifices are involved, or if there is ulceration,
time of its occurrence after food varies according to the seat of
in the same manner as has been described when speaking of
n. The rejected matters not uncommonly contain numerous
ventriculi and torulæ, as well as occasionally cancerous ele-
when there is ulceration they may be very offensive.

atemesis is a very frequent and early symptom, but usually to a
nount. Large hæmorrhages are stated only to occur in the
ges, and not to be so common as in connection with ulcer, but
er statement is certainly not always true, according to my experi-
Ielæna is often observed at the same time, or even independently
temesis.

and resistance over the epigastrium, perhaps not u
manipulation and percussion, the sound producec
somewhat dull and muffled. This indicates extensi
walls. 2. A distinct tumour, especially in connec
the pylorus. Its site is usually the right hypochond
but it may be felt in the iliac fossa owing to displac
near the umbilicus. The tumour is small, circum
and irregular. Not usually movable by manipu
alters its position with change of posture and wit
distension of the stomach. There is dulness on
tumour. Aortic pulsation may be transmitted thr
that a tumour may disappear completely by slou
3. Dilatation of the stomach, due to pyloric obstruc
of the abdomen, which may become concave, and
is present a tumour can be more easily detected,
visible. On the other hand in exceptional instanc
presses on the portal vein and thus causes ascites.

General.—The constitutional symptoms are as a r
viz., early and rapidly-progressing emaciation and
often becoming extreme; signs of the cancerous
being dry and harsh, with a dirty, sallow, or earth
tures sunken and pinched; marked anæmia, espec
has been lost, with a tendency to œdema of the le
thrombosis; great weakness of the heart and pulse
with a melancholic and anxious expression, or irritabi
and disturbed sleep. Occasionally jaundice is obse
sure on the common duct. In the later stages the
and then a little elevated, but pyrexia is absent as a

The course and duration are subject to some va
the progress is continuous and rapid; sometimes
even marked remissions in the symptoms, but these
length of time. Cases rarely extend beyond two ye

External pressure from—*a*, tumour of the pancreas; *b*, canses projecting from the liver; *c*, enlarged glands; *d*, very our connected with the gall-bladder.

—Pyloric obstruction causes the stomach to become dilated, alls hypertrophy, especially the muscular coat, in the enovercome the interference with the passage of the food, the the same time being contracted.

s.—There may be evidences of some organic disease of the ut the pylorus, or of something in its vicinity causing preshe only positive clinical indications of pyloric obstruction from the characters of the vomiting and of the matters th the presence of the physical signs of a dilated stomach. g comes on some hours after food, or only at intervals of a great quantity being then discharged. The vomit never e, but is strongly acid, presents numerous sarcinæ and readily ferments. The stomach may be so much enlarged general distension of the abdomen. The physical characters gement are as follows:—(i.) The shape of the stomach may nd made out by careful examination; while movements of the metimes be felt or excited. (ii.) On succussion a splashing often experienced when the stomach contains liquids. (iii.) shows extension of the stomach-note upwards as well as if the organ is empty. If it contains food or fluid, hows dulness below, as after taking a good draught of water; ness may be made to alter its position by changing the e patient. (iv.) If a probang is passed by the œsophagus, the bottom of the stomach and be then felt through the alls. (v.) Emptying the stomach by means of the stomachford some aid. (vi.) Auscultation reveals a splashing sound n; the sound of food or liquids falling into the stomach ved; or loud heart-sounds reverberating through the space. eart may be displaced upwards. Occasionally the patient a sensation as if the food passed too low in the abdomen.

of the stomach may also result from obstruction of the or, rarely, of the upper part of the jejunum. A certain stension is due sometimes to deficient tone of the muscun weakness or want of proper innervation. As exceptional to be mentioned local paralysis near the pylorus, interfering pulsion of food; hernia of the stomach through the diats displacement by an omental hernia; and accumulations ibstances in its interior, such as hair. Dilatation of the been attributed to sarcinæ, but this is extremely doubtful.

It will be most convenient to consider the diagno
orders according to certain groups in which the
practice.

1. Many cases come under observation evidentl
class of dyspeptics. It is requisite to determine
pepsia is present; and what are its causes. The tw
be distinguished are the atonic and irritative, whi
rated by the difference in the intensity and characte
in the epigastrium; the conditions of the tongue, r
the absence of thirst in the atonic form; the mino
disturbance in the same, which is also of a different
no fever. Further, diarrhœa is often present in t
while in atonic dyspepsia there is generally persi
With regard to the causes of any dyspeptic symptoms,
tained by a satisfactory inquiry into the habits of th
the condition of the various organs and general sys
larly necessary to recollect that they may depend upo
kept up by portal congestion, or upon some cons
especially Bright's disease; or that they may be me
some serious organic affection of the stomach. I
elements of food are not properly digested, it has
evacuate some of the contents of the stomach at
the aid of the stomach-pump, and thus obtain them

2. It is frequently difficult to diagnose between n
pepsia and the less serious organic affections, viz.,
tion and chronic gastritis. The opinion has bee
that in many cases of irritative dyspepsia chronic
present, and it is scarcely practicable to draw a line

3. Young women not unfrequently present them
of severe gastric pain, in whom it is difficult to dete
whether they are suffering from mere gastralgia or ne

diagnosis between mere functional disorder and grave organic the stomach—either chronic ulcer or cancer—for a time very Persistent disturbance of digestion without any evident cause, elding to proper treatment, should lead to the suspicion of the of serious organic disease, though it must be remembered that oms may be due to glandular degeneration. The diagnosis rendered more positive by the presence of marked localised ased by food; tenderness; vomiting; hæmatemesis; and pro- aciation. Some of these symptoms, however, especially pain, wn to be very intense in connection with mere functional dis- nales and gouty subjects. With regard to hæmorrhage, it is to observe that the blood, if in small quantity, is sometimes d, but passed entirely in the stools, and therefore in any se it is desirable to examine the fæces.

diagnosis of chronic ulcer from cancer is frequently very first. The circumstances in favour of the latter are:—the ng a male and advanced in years; hereditary history of in more constant and less influenced by food and vomiting; slight or absent; hæmorrhage not occurring in the earlier late in the case, and being on the small scale; marked and ive disturbances, appetite being much affected; considerable wasting, especially if independent of vomiting or loss of evidences of the cancerous cachexia. Later on, the dis- tumour, especially near the pylorus; signs of obstruction of orifice, with dilatation of the stomach; inefficiency of treat- almost continuous and speedy progress of the case; and ns of cancer in other parts, usually serve to render the diag- It is necessary to guard against mistaking a contracted tumour.

ard to the part of the stomach involved, this can often be r noting the exact seat of the pain and tenderness; the rela- and vomiting to food and posture; the state of the stomach, ction or dilatation; and the locality of any physical signs. ions of the stomach may simulate neighbouring diseases, or specially disease of the duodenum or head of the pancreas; he small or large omentum; hepatic affections; the passage ne; diseases of the glands in the vicinity; affections of the colon; and painful conditions of the abdominal walls. In l case a correct diagnosis can only be arrived at by a careful n of all its details.

onally rare conditions in connection with the stomach give h difficulty in explaining symptoms associated with this such which have come under my own notice I may mention ne walls of the stomach; and hernia through the diaphragm. ier hand, it must be remembered that extensive organic exist, even cancer involving a considerable portion of the out any or with only slight local symptoms, there being ound interference with the general nutrition.

II. PROGNOSIS.

The prognosis in any case of dyspepsia wi
time the symptoms have lasted ; their causes a
removed ; and the ability and willingness on
submit to appropriate treatment. When ind
habitual condition, it is frequently very difficul
is associated with permanent organic changes i
the stomach, with conditions keeping up ve
some general disease ; or if the patient pers
Most cases may, however, be restored if prope
events may be much improved. If there is
mucous coat of the stomach with its glands
morbid changes, especially after the abuse of
highly dangerous, owing to the interference wit
and the patient may gradually sink from ma
pepsia occurring in the course of various chro
their prognosis much more grave.

Gastralgia is frequently difficult to get rid of
especially in elderly persons, on account of
and because this prevents them from taking foo

Gastric ulcer is necessarily a dangerous les
occurs in young women is the more immedia
its tendency to perforation and hæmorrhage.
these cases, however, recover, the ulcer cicatri
shows much less disposition to heal, but is
speedily fatal issue, death usually taking place
proportion to the severity of the stomach sy
and hæmorrhage—is the prognosis more grave
zation may become serious.

Cancer is necessarily a fatal disease, and the
one of duration. This must be determined
symptoms, and the progress of the case. R
extend beyond two years, and generally it is m

III. TREATMENT.

There are certain principles to be followed i
chronic gastric affections which will now
calling for special notice being pointed out
marks.

1. Regulation of the diet is obviously the
cases. This involves not merely directions as
but also with regard to quantities, intervals,
other matters. In many cases of dyspepsia thi
ing attention, without which all other means ar
would occupy too much space to indicate all
required in different forms of stomach derang
has generally to be determined by the exper
patient. There are, however, certain broad fa

In all cases substances which are known to be indigestible, such as pastry, cheese, many fruits and vegetables, fresh bread, and most made-dishes, must be avoided, and plain food only be taken. Meat is decidedly beneficial in atonic dyspepsia, fresh beef and mutton, not too fat and properly cooked, being those which are most suitable. Pork, veal, and salted meats must be forbidden. In proportion to the degree of irritation present, and especially if there is chronic gastritis, does it become requisite for the diet to be more bland and easily digestible. In such cases white fish, light soups, chicken, game, jellies, calves' feet, sweetbread, the yelk of eggs, milk-puddings, and such articles answer best, and it is often better to give food in small proportions at rather frequent intervals, than in any considerable quantity at a time.

The question of drink calls for special notice. Many patients suffer from abuse of tea, and it is frequently desirable to forbid this absolutely, and order cocoa or milk instead, the latter being advantageously mixed with lime or soda-water. Instructions must also be given against taking large quantities of cold water, especially during meals. A glass of good bitter ale or stout with meals is often beneficial in atonic dyspepsia, provided it does not produce flatulence; a moderate quantity of wine may also be useful, just before and with food, especially dry sherry, champagne, claret, or hock. When there is an irritable condition of the stomach, much care must be exercised in the use of stimulants.

In functional disorders of the stomach attended with severe pain after food, it is sometimes requisite to insist upon patients taking meals properly, as they will otherwise go without, and are thus only aggravating the mischief; underdone meat is beneficial in many of these cases, and it may be pounded. Where mastication is impracticable, food must be artificially divided before it is taken; in the case of old people and others who have lost their teeth, it is often extremely serviceable to provide them with a set of artificial teeth.

In treating gastric ulcer, especially the perforating variety, diet is all-important. To promote the healing process and prevent untoward events, one main object is to keep the stomach in as absolute a condition of rest as possible. Hence anything which can in the least irritate or give rise to flatulent distension must be absolutely avoided. Further, the food should consist of liquids or pulpy materials, such as thick soups, pounded underdone meats, meat extracts, milk, either alone or thickened with corn-flour or arrow-root, the yelk of eggs beaten up or soft boiled, and these must be given only in small and regulated quantities, at stated intervals. In treating young women suffering from perforating ulcer it has been well recommended to keep the patient in bed for some weeks, so that less nutriment may be required, and thus the stomach be less disturbed. Some have even gone so far as to advocate that the patient should be entirely supported by nutrient enemata, but this is rarely required.

In cancer no rules can be laid down, but as digestible and nutritious food as possible must be given, each case being managed on its own merits. It may not be altogether useless to remark, that both in cancer and ulcer the position assumed during and after the taking of food has sometimes an influence in the way of relieving pain and other symptoms.

In some cases it is requisite to be particular as to the elements of food which are permitted. Thus, if there is much tendency to acid fermentation, starchy substances are contra-indicated. Marcet and Pavy have recommended in certain conditions the employment of food artificially digested before its administration.

2. The next matter requiring attention is general hygienic management. Many cases of functional disorder of the stomach, as well as of chronic catarrh, and even of ulceration, are greatly benefited by attention to various matters coming under this head, of which only the chief can be mentioned, without entering into details, viz., the taking of a proper amount of exercise, but not immediately before or after a meal; avoidance of much mental work, harassing anxiety, and brooding over symptoms; mingling in cheerful society; change of air and scene; abstinence from injurious habits, such as intemperance or excessive smoking; promotion of the action of the skin by cold bathing or douching, if this agrees, or by an occasional warm bath or Turkish bath; and the wearing of warm clothing, with flannel next the skin.

3. Coming next to the employment of therapeutic agents, in the first place those medicines require notice which act more directly upon the stomach. These must not be given indiscriminately, and much care is required in their administration. They act by increasing the appetite; giving tone to the stomach and aiding its muscular contractions; promoting the secretion and improving the quality of the gastric juice, or on the other hand checking excessive secretion; or by producing a sedative effect upon the stomach. The chief remedies include alkalies, viz., liquor potassæ, the carbonates of soda, potash, or ammonia; mineral acids, especially hydrochloric or nitro-hydrochloric and phosphoric; tincture or extract of nux vomica or strychnia; cinchona or quinine, which, however, must be used with particular caution, as they are apt to disagree; vegetable and aromatic bitters, viz., calumba, gentian, orange-peel, quassia, chiretta, cascarilla, chamomile, absinthe, and hop; aromatics and stimulants; carbonate or nitrate of bismuth. These may be variously combined, and among the most useful combinations may be mentioned an alkali with tincture or infusion of calumba or gentian and aromatic spirits of ammonia; dilute hydrochloric acid with the same bitters or with orange peel, to which tincture of nux vomica (♏v to x) may often be very advantageously added; bismuth with carbonate of soda and some bitter infusion. Hydrocyanic acid is in many cases an useful addition to these mixtures. When giving the vegetable bitters it is desirable to begin with a moderate dose, as they sometimes disagree at first. Medicines for promoting secretion are best administered shortly before or during meals. Alkalies certainly act in this way; acids may be used to check excessive secretion, when given just before meals, but their continued administration also seems to increase and improve the gastric juice, by improving the condition of the lining membrane and its glands. Ipecacuanha, in doses of gr. ½ to i in pill, has been recommended as a promoter of secretion; and also hot condiments and other stimulants. The last are useful in some cases, but the habit of always taking them before meals is decidedly to be deprecated.

When there are evidences of much gastric irritation, most benefit is usually derived from the use of bismuth with alkalies and hydrocyanic acid, to which morphia may be added should there be much pain.

netimes, however, mineral acids act well in this condition; and occa-
nally, even when there are distinct signs of subacute gastritis, I have
own strychnine to be the only remedy affording relief. In cases of
tinued gastrorrhæa some of the most efficacious medicines are
de of zinc, oxide or nitrate of silver in minute doses, and vegetable
ringents. Arsenic is also recommended. Opium or morphia is of
at value in some morbid states of the stomach, particularly in that
ich is due to chronic alcoholism. Dr. W. Fox has found the com-
und kino powder very useful in these cases. In that variety of indi-
stion in which the food passes immediately out of the stomach, I
re found most benefit from the administration of bismuth before meals,
mbined with tincture of opium (♏ iv—viij).

Important remedies are also employed as substitutes for the gastric
cretion, viz., hydrochloric acid and pepsine, either separately or in
mbination. In some cases it is advisable to mix these with the food
fore it is taken; or they may be administered during meals. They aid
o in preventing the decomposition of food which is so apt to occur.
ctic acid has been likewise used for this purpose.

The drugs thus far considered are often of service in cancer and
ronic ulcer, and may be tried should symptoms seem to indicate a
cessity for them. With regard to medicines which directly promote
e healing of an ulcer, nitrate or carbonate of bismuth is supposed to
t thus, given in gr. x doses every four or six hours, and also nitrate
oxide of silver; either of these may be combined with opium or
orphia. There is no known remedy which has the least direct influ-
ce upon cancer of the stomach.

4. Symptomatic treatment almost always demands attention in stomach-
omplaints. The chief symptoms which call for interference are pain;
ausea and vomiting; heartburn and acidity; flatulence; eructations;
yrosis; constipation or diarrhœa; and in certain cases hæmatemesis
r perforation. The treatment of most of these has already been fully
onsidered. Pain may be relieved by opium, morphia, hydrocyanic
cid, belladonna, conium, spirits of chloroform, or chloral internally:
ith external applications over the epigastrium, viz., dry or moist heat;
old in some cases, especially of cancer; anodyne fomentations; turpen-
ine stupes; sinapisms; or, if the pain is continuous, a small blister,
hich may be dressed with morphia, or a belladonna or opium plaster.
f the pain is severe, subcutaneous injection of morphia may be em-
loyed. Frequently it is associated with flatulence or acidity, and is
hen relieved by removing these conditions. Flatulence and eructations
re usually much diminished by the use of the medicines already con-
dered, which act upon the stomach and food. A combination of
smuth with freshly-prepared charcoal, given after meals, is efficacious
preventing the former; as well as such remedies as assafœtida, gal-
num, musk, valerian, sumbul, spirits of ammonia, oil of rue or cajeput,
d peppermint. Sometimes small doses of creosote, carbolic acid,
lpho-carbolates, or hyposulphites may be given with benefit. Acidity
d heartburn are best relieved by a little carbonate of soda or potash,
agnesia or carbonate of magnesia. Frequent acid eructations are
nerally an indication for mineral acids; they may depend on exces-
re formation of gastric juice, or fermentation of food from deficiency

mercury or podophyllin; gout; hysteria; malarial disease. Gastralgia is usually much benefited by various other nervine tonics.

6. With regard to those conditions in which tl dilated, it has been recommended to use the sto tically; and also to wash out the organ, using various those of an antiseptic character.

CHAPTER XXXVI.

ON CERTAIN INTESTINAL SYMPTOMS AN DISORDERS.

I. ENTERALGIA—INTESTINAL Co

ETIOLOGY.—It is very probable that neuralgic pain nection with the intestines, corresponding to gastra colic, however, is attended with irregular spasmodi muscular coat. Its causes are:—1. Irritation of the or undigested food; cold drinks or ices; irritant, substances; excessive or morbid secretions, espe fæces, colic being often associated with constipation foreign bodies, such as fruit-stones, gall-stones, or diseases of the intestines; and the different forms Reflex irritation, *e.g.*, from ovarian and uterine affec or a renal or hepatic calculus. 4. Morbid cond especially in gout and perhaps rheumatism. 5. Disorders of the nervous system, particularly in con ing, what is commonly called griping. Pressure almost always rked relief, the patient either bending forwards and pressing hands, or lying upon the abdomen; at the same time being less, rolling and tossing about from time to time. Should the ntinue for a long time, a little soreness may be left. Ordi- e bowels are constipated and distended with flatus; diarrhœa present, however, in some conditions. Occasionally vomiting ce, but then probably the stomach is affected. *Physical exami-* nerally discloses flatulent distension, except in lead-colic, which eparately considered hereafter; while the spasmodic movements owels and rolling about of flatus can often be felt. The ab- muscles are also commonly in a stage of rigid contraction, or here and there.

atient presents an expression of suffering, and if the pain is ere and prolonged, there may be symptoms of more or less Pyrexia is absent. The attack lasts a variable time, and nds abruptly, being followed by a feeling of great relief and

TMENT.—The first thing to be attended to is to find out the the colic, and get rid of this. A free aperient enema is gener- ul, to which may be added some turpentine or assafœtida if much flatulence; or a brisk purgative may be given by the n less urgent cases, such as a full dose of castor oil, alone or l by calomel, a black draught, or one containing sulphate and e of magnesia with peppermint-water. Opium is the chief for the relief of pain and spasm; it is best given in the form of or liquor opii sedativus, which may be combined with spirits oform and tincture of cardamoms. In severe cases subcutaneous n of morphia may be employed. Warm carminative drinks are il, or a little hot spirit and water. Should the attack be associ- h hysteria, a draught containing tincture of valerian or assafœtida ted. The patient should be kept warm; and the assiduous ap- n of dry heat over the abdomen, with friction, will usually afford ief. Some prefer hot fomentations. Any signs of collapse must ated by stimulants. It may be remarked that infants probably ten from colic, on account of improper feeding. This must be d by careful attention to diet; but should it arise, carminative ay be given, with magnesia or a little castor oil, and heat applied abdomen.

II. Constipation.

OGY.—The immediate causes of this very common symptom summed up as:—1. Mechanical obstruction in some part of entary canal, interfering with the passage of the fæces. 2. Defi- ristaltic action of the intestinal muscular coat, especially of the wel, generally due to impaired excitability of the nerves. 3. cy of secretions, particularly the intestinal secretion and bile; me believe, their excessive absorption; the fæces being hence , while at the same time the peristaltic action is diminished. rst class of causes will be separately considered. The others may be associated with organic diseases, but are very frequently the consequence of mere functional disturbance. This may arise from [illegible] great variety of causes, of which the chief are habitual neglect of the act of defæcation, either from carelessness, want of time, or undue modesty; indulgence in astringent articles of diet; habitual use of opium; excess in smoking; sedentary habits, especially if combined with much mental work; enervating habits, particularly lying to a late hour in bed; anæmia, debility, and want of tone from any cause; dyspepsia, particularly if accompanied with much flatulence; most acute febrile diseases; various chronic affections, especially those connected with the nervous system; uterine and ovarian derangements; and the presence of lead in the system.

Undoubtedly some individuals are predisposed to constipation, particularly those who are of a slow, lethargic temperament. This disorder is more common in females, and is more liable to arise as age advances, though it is very frequent in young women, especially in connection with hysteria.

SYMPTOMS.—Constipation simply means that the stools are not passed often enough, being at the same time generally deficient in quantity, as well as too dry and solid. In many instances it is a mere temporary derangement; but in others the bowels are habitually confined. Some individuals state that their bowels are regular, simply because they go to stool every day, but in reality they suffer from habitual constipation, as they only pass small lumps of hard fæces; hence the necessity of making close enquiry in any doubtful case. The degree of constipation varies much, but it is not uncommon to meet with patients, especially females, whose bowels are only moved once or twice a week; and sometimes the intervals are even longer than this, being in exceptional cases quite extraordinary. Hence fæces may accumulate to an enormous amount in the intestines, distending them greatly; and when discharged they are firm, often extremely hard, dry, in the form of scybalous lumps or large masses, frequently pale and unusually fœtid. Hard excrement may set up irritation, and excite a kind of diarrhœa attended with the discharge of mucus or pus, and thus may mislead as to the actual conditions present, the fæces being in reality retained. The passage of indurated fæces may give rise to a great deal of pain about the anus, with straining, and sometimes discharge of blood. When retained, excrement is very liable to undergo decomposition, thus giving rise to much painful flatulence; the secretions are also still more interfered with, as well as the motor functions of the bowels, and dyspepsia, usually of an atonic kind, is set up. The mechanical effects of accumulated fæces are often very serious, and they may cause complete obstruction or ulceration and perforation; they not uncommonly can be detected by physical examination of the abdomen as tumours, which may simulate various other abdominal enlargements. As a rule these correspond in position and shape to the cæcum, or some part of the colon; they often have a doughy feel, yielding to pressure, by which they are sometimes much altered; and percussion generally elicits a combination of dulness and tympanitic sound. In some cases, however, these accumulations produce extensive, irregular, solid enlargements, greatly resembling those due to cancer. Therefore the possibility of any doubtful tumour being

es should always be borne in mind, and the effects of
id enemata observed before a positive opinion is given.
general system the effects of habitual constipation are fre-
marked. It produces a state of nervous depression; and
g with digestion and nutrition may cause much wasting and

NT.—It is needless to enumerate here the various remedies
r accidental constipation, as these are discussed in thera-
A few remarks as regards the management of habitual
are, however, necessary. 1. It is most important to im-
patients the necessity of paying attention to the habit of
l daily, at the same hour, and having a proper evacuation,
is is neglected for a long period it becomes extremely diffi-
e the bowels to their normal activity. 2. Change in diet
removing constipation. Astringent articles of food must
Bran-bread, oatmeal cakes, and porridge, certainly prove
not a few cases; and figs or rather acid fruits are also
ie instances. Any injurious habits which tend to confine
iust be avoided, and a proper amount of exercise be taken.
; with douching of the abdominal walls is often beneficial;
n with relaxed walls, the plan of wearing a broad bandage
dy, firmly applied, is exceedingly serviceable. 3. It must
ten that the inactivity of the bowels may be due to a general
, and hence tonics are frequently useful, particularly those
ve the condition of the alimentary canal; the most bene-
: non-astringent preparations of iron, mineral acids with
ns or tinctures, strychnia, and extract or tincture of nux
ould there be any lead in the system giving rise to con-
lide of potassium is the remedy. 4. Various aperient medi-
usually to be employed, but it is highly desirable to avoid
ie habit of taking these, if possible, especially the stronger
nd therefore in any case as soon as the desired effect has
ed, and the bowels have been properly emptied, purgatives
pped, and the patient impressed with the importance of
p up a regular action by attention to the matters already
Among the most efficacious aperients in these cases are
senna or sulphur, taken early in the morning; compound
sulphate of magnesia, ʒ½ to ʒi three times a day, which is
ially combined with sulphate of iron; sulphate of potash,
ecommended for children; aloes, in the form of extract or
specially valuable if the colon is torpid; and extract of
doses of $\frac{1}{6}$th to $\frac{1}{4}$th gr. once a day. The last-mentioned
ly come into high repute, and has been particularly recom-
Trousseau; a combination of this remedy with extract of
is very serviceable in some cases. Not uncommonly it
essary to use stronger purgatives from time to time, such as
locynth, blue-pill, calomel, jalap, or gamboge. If the bile
deficient, podophyllin is valuable, or some recommend
x-gall. Some of these remedies may be given in different
with advantage, made up into pills with extract of gentian
hyoscyamus. It seems best to administer them just be-

fore or during a meal. Various aperient mineral waters are often serviceable, especially Friedrichschall water.

The employment of simple enemata in cases of habitual constipation is not carried out to the extent which it deserves. Unquestionably a morning injection of water, soap and water, or a solution of salt, will often prove highly efficacious; if necessary a little castor-oil may be added. The use of a suppository of soap is a popular remedy in some parts, especially in the case of children. It has been recommended to galvanise the abdominal walls.

Occasionally, as the result of long-continued accumulation, the rectum becomes greatly distended with solid and dry excrement, which has to be mechanically scooped out. Enemata may be used to aid in softening this hardened fæces, and breaking it down.

III. DIARRHŒA.

ETIOLOGY.—Diarrhœa results either from increased peristaltic action of the intestines; an unusually liquid state of their contents, especially when due to excessive secretion; or, most commonly, from both these conditions combined. The *exciting causes* of these morbid phenomena may be thus arranged:—1. Irritation of the intestines by food, either taken in excess, of improper quality, or having undergone decomposition; impure water or other liquids; purgative medicines and irritant poisons generally; excessive or unhealthy secretions, especially bile; worms, trichinæ, and other parasites, possibly vegetable as well as animal; or retained fæces. 2. Mechanical congestion of the intestinal vessels, owing to some obstruction in the portal circulation. 3. Organic affections of the intestines, viz., enteritis, either acute or chronic; albuminoid infiltration; and ulceration. 4. Occasionally mere nervous disturbance, *e.g.*, strong mental emotion, or reflex irritation in connection with dentition. 5. Certain diseases in which diarrhœa is a prominent symptom, especially cholera, typhoid fever, and dysentery. By many it is then regarded as eliminatory in its character, serving to carry off some poisonous material; and the same theory is applied to its occurrence in renal disease, gout, pyæmia, and various fevers, or when it takes place as a critical discharge at the close of pyrexial affections. Diarrhœa not unfrequently sets in during the course of certain wasting chronic affections, especially towards their termination, aiding in bringing about the fatal result, especially in phthisis, cancer, splenic or supra-renal disease, and Hodgkin's disease. 6. The rapid suppression of discharges, or the absorption of dropsical fluid, when the diarrhœa is termed vicarious. 7. Causes of a more general character, viz., exposure to changes of temperature, or excessive cold or heat; foul air, over-crowding, and other anti-hygienic conditions; excessive fatigue; emanations from decomposing animal matter; and malarial influence. The combined action of some of these, along with improper diet, gives rise to the summer and autumn diarrhœas so prevalent at these seasons. 8. Very rarely the escape of some fluid accumulation into the intestines, such as the contents of an abscess, peritoneal effusion, or hydatid tumour.

CHARACTERS.—In all cases of diarrhœa it is requisite to ascertain its duration; the number of stools passed in the twenty-four hours; their

ıe introduction of food, if any; and also to inspect speci-
discharges, if practicable, as frequently as may be desired.
ıl varieties of loose stools are fæculent; lienteric, when they
nizable fragments of food, in some cases scarcely at all
ilious; serous or watery, also called a flux; mucous or gela-
ɔdy; fatty; purulent; chronic or white flux. As a rule the
e more or less mixed, and by an examination of the charac-
tools the cause of the diarrhœa may be often determined.
.er digestive disturbances are usually associated with this
; indicated by griping or other pains in the abdomen, sick-
rygmi, straining at stool, or an abnormal state of the tongue.
nay irritate the anus considerably, especially when the diar-
-continued and of a watery kind. It must be remarked that
netimes state that they are suffering from looseness of the
n on investigation it will be found that there is only some
ge, especially in connection with fistula in ano. The associa-
ɔus discharge with retained fæces has already been alluded to.
ea is considerable or of long duration, it necessarily causes
wasting, in some instances very rapidly and to a marked

NT.—The first matter as regards the treatment of diarrhœa
ine whether it should be stopped or not. In some instances
desirable, provided it is not excessive, the discharge by the
g preservative, as, for instance, in connection with Bright's
ortal congestion. Some even go so far as to promote diar-
tain diseases, such as cholera and typhoid. As a rule it is
check it entirely or partially. For this end the diet must be
lated, and this may be the only thing needed, especially in the
lren. Milk with farinaceous articles, especially arrowroot and
reak beef-tea thickened with these materials; and milk pud-
tute the best articles of diet. Milk with lime-water properly
d will often speedily put a stop to the diarrhœa of children.
ses a little brandy and water, or a mixture of brandy with
; beneficial. Not uncommonly an aperient is indicated at
with the view of getting rid of irritant materials. Castor oil,
aline draught or Seidlitz powder, or a full dose of tincture
act best in these cases, and they are often advantageously
vith a little opium. Antacids, such as carbonate of soda
ı, are beneficial when there are irritating secretions in the

ıe direct remedies for combating diarrhœa opium holds the
given either alone or with other medicines, in the form of
:, confection, various powders, enema, or as syrup of poppies.
n of ♏15 to 20 of laudanum with ℥iss—ij of decoction
ten acts most beneficially. The other principal medicines
d in acute cases are prepared chalk, aromatic confection,
ıo, logwood, krameria, alum, dilute mineral acids, especially
annic and gallic acids, carbonate or nitrate of bismuth,
d chlorodyne; in chronic cases tincture of sesquichloride
of pernitrate of iron, acetate of lead, sulphate of copper,
f silver. Ipecacuanha is invaluable in certain forms of diar-

with which it is supposed to be associated.

Local applications to the abdomen are frequentl
the form of poultices, fomentations, or dry heat.
round the abdomen is useful in some chronic ca
patient may by voluntary effort to some extent supp
cially when this is due to emotional disturbance.

IV. MELÆNA—INTESTINAL HÆMOR

ETIOLOGY.—Most of the causes of melæna are si
give rise to hæmatemesis, and it will be sufficient
them thus:—1. Traumatic injury. 2. Diseased con
3. Vicarious. 4. Mechanical and chemical irrita
of the bowel, especially by violent purgatives, cant
various irritant poisons, hardened fæces, and rough
diseases, viz., enteritis, ulceration, especially in typh
tery, cancer, invagination, piles, prolapsus, fissures
anus. 6. Extreme mechanical congestion, from p
after heart or lung disease. 7. A tumour eating its
tines; or an aneurism bursting there. 8. Passage
stomach into the bowels, following hæmorrhage into

CHARACTERS.—When blood appears in the stools
altered in characters, but this will depend upon its
and the rapidity with which it escapes. When
coming from the upper part of the bowels and slow
more or less dark, often being quite black and pr
sooty aspect; or it may resemble coffee-grounds.
source, but copious and speedily removed, it may
though it is usually of a very dark colour. When co
intestines, especially near the anus, it is generally q
changed. The quantity varies much, ranging from
amount sufficient to cause speedy death. By atten

CHAPTER XXXVII.

MMATION OF THE INTESTINES.—INTESTINAL OR TERIC CATARRH. — ENTERITIS. — DUODENITIS.— PHLITIS AND PERITYPHLITIS.

MATION of the bowels presents considerable varieties as to the
hich are involved, and the extent of the intestinal tract which is
ted; hence the clinical history of this disease is anything but
. The term enteritis has been used very vaguely, and several
conditions have been included under it. It will be convenient
o consider in the present article all forms of disease in which
stines generally, or any portion of them, are inflamed, apart
ecial affections, such as dysentery or typhoid fever.

LOGY.—The causes of intestinal inflammation are very similar
e which induce gastritis. Enteric catarrh is ordinarily due
direct irritation by food or other materials, or to a cold; it
frequently associated with various exanthemata and dentition.
poisons give rise to more severe inflammation. A very
form follows obstruction of the bowels; this also sometimes
rom ulceration, or from extension of peritonitis; and is said to
rare instances idiopathically. The local variety named *typhlitis*
mmation of the cæcum is generally due to the lodgment of hardened
foreign bodies in this part of the intestine or in the appendix
rmis, which often ultimately leads to ulceration and perforation.
itis, followed by ulceration, is peculiarly liable to be set up after
nd scalds. Chronic intestinal catarrh remains occasionally after
attack, but usually results from the repeated action of irritants,
sociated with ulceration, lardaceous disease, or other organic
.

OMICAL CHARACTERS.—In the milder forms of catarrh, the ap-
es resemble those observed in catarrh of other mucous surfaces,
ed not be described. The secretions are abundant and often
tating, being sometimes mixed with blood. Superficial erosions
t ulcerations are not uncommon. Occasionally a croupous or
nous deposit is observed over the surface more or less exten-
hich indicates greater intensity of the inflammatory process.
this be very violent, implicating the entire thickness of the gut,
ur is extremely deep, sometimes purple or almost black, with
extravasation; all the coats are thickened and softened, gener-
ltrated with serum, or occasionally with exudation or pus; while
stinal contents are often mixed with blood. Gangrene occurs in
ses. The peritoneum may be involved by extension, exhibiting
of lymph corresponding to the inflamed bowel.

nple catarrh the entire mucous tract is frequently affected, the
n beginning above and extending throughout the intestines; it
wever, be limited. The more severe forms are usually con-
short portions, which are generally much distended, particularly

rhœa. Among the mo[illegible]
mixture with catechu [illegible]
with or without opium [illegible]
ticularly valuable for [illegible] [illegible]on and [illegible]
Dover's powder, alo[illegible] [illegible] perforation [illegible]
cases, pills containin[illegible] [illegible] causing [illegible]
Creosote, carbolic [illegible] up inflammation [illegible]
certain forms of dia[illegible] [illegible] formation of an [illegible]
with which it is su[illegible] [illegible] of directions. [illegible]
Local applica[illegible] [illegible] any actual [illegible]
the form of pou[illegible] [illegible] foreign body or [illegible]
round the abdo[illegible] [illegible]eign substance which [illegible]
patient may b[illegible] [illegible]on which faeces and [illegible]
cially when t[illegible] [illegible]ich come to resemble [illegible]
[illegible] Of course it must be re[illegible]
[illegible] other forms of ulceration [illegible]

Etiolo[illegible] [illegible] mere distension of this part [illegible]
give rise [illegible] some extrinsic growth. The same [illegible]
them th[illegible] [illegible]served on the opposite side of the [illegible]
3. Vica[illegible] [illegible] sigmoid flexure. A localised [illegible]
of the [illegible] described in the colon—[illegible]
vario[illegible] [illegible], beginning in the submucous tissue. [illegible]
disea[illegible] [illegible]struction of the mucous membrane.
tery. [illegible] intestinal catarrh becomes chronic, there are [illegible]
anu[illegible] [illegible] which is often dark or even black from pigment [illegible]
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are in some cases entirely absent, except, perhaps, stion from excessive diarrhœa. In the more severe rexia is observed, with languor, general depression, hildren there is frequently high fever, with much tly distended abdomen, and aphthous stomatitis. sions or coma set in, and death may result from this haustion. In cases of poisoning the general symptoms being often a tendency to collapse; and the same thing observed in severe enteric catarrh from other causes, persons constitutionally weak, or who are the subjects of nic lowering disease.

nited intense form of inflammation which involves all the coats ptoms essentially distinct from those just described, and it is to riety that many authors limit the term *enteritis*. Here the ed portion of the intestine, which is at first the seat of spasm, n becomes paralysed, so that the contents cannot pass along, but cumulate in the part above. The early symptoms are much localised pain with tenderness, often referred to the umbilical region, increased by movement, along with general colicky pains and tormina; obstinate constipation; constant nausea and vomiting; thirst; a furred tongue; and pyrexia, preceded by rigors, the patient presenting a distressed and anxious expression. In a short time, if there is no relief, the abdomen swells from tympanitis, while the painful sensations subside more or less, in some cases completely; the vomiting gradually becomes stercoraceous, at last the materials coming up without any effort; the tongue assumes adynamic characters; and signs of collapse set in, with a pinched countenance, and extremely feeble and irregular pulse, the brain being either unaffected to the last, or death being preceded by low nervous symptoms. The urine is much diminished or suppressed. Hiccup is often a distressing symptom.

Typhlitis is generally indicated at the outset by pain and tenderness in the right iliac fossa, often severe; with, in some instances, distinct physical signs of an accumulation in the cœcum: and constipation, followed by mucous or muco-purulent diarrhœa. Sudden perforation may take place into the peritoneum, even when there have been no previous serious symptoms. In other cases perityphlitis is set up, as evidenced by local redness; a firm swelling; œdema of the skin; increase of pain and tenderness; rigors and pyrexia: followed usually by signs of the formation of an abscess, which may open in various directions, either externally or internally, sometimes thus setting up peritonitis. The pus has often a fæcal odour, and may be mixed with actual fæces or gas. If the case is not speedily fatal, a permanent opening may remain, death occurring gradually by hectic: or ultimately recovery may ensue, the abscess healing up. The same symptoms are observed in rare instances in the left iliac fossa, in connection with the sigmoid flexure.

Chronic intestinal catarrh frequently has no other symptom than chronic diarrhœa, the stools being liquid, pale, fermented, often very offensive, or lienteric, varying much in number and quantity. In many cases uneasy griping sensations and gurgling are experienced from time to time; or there may be some soreness over the abdomen. Gastric symptoms are generally present, and the tongue is often abnormal.

when the inflammation depends upon obstruction, the part beyond being contracted.

In typhlitis the cœcum or appendix becomes much inflamed from irritation, and this leads to ulceration and destruction of the coats, which is liable to end in rupture or perforation. The perforation may take place into the peritoneum, causing peritonitis; or into the surrounding cellular tissue, setting up inflammation there—*perityphlitis*—which usually terminates in the formation of an abscess, and this, if not opened, may burst in a variety of directions. Possibly perityphlitis may be excited independently of any actual perforation. The cause of the irritation is usually some foreign body or hardened fæces. In the appendix some small foreign substance which has gained an entrance becomes a nucleus upon which fæces and secretions are deposited, forming concretions which come to resemble fruit-stones, for which they have been mistaken. Of course it must be remembered that perforation may result from other forms of ulceration which are met with in the cœcum; from mere distension of this part of the intestine; or from its destruction by some extrinsic growth. The same course of events is now and then observed on the opposite side of the abdomen, in connection with the sigmoid flexure. A localised variety of inflammation has also been described in the colon—*colitis*—supposed to be distinct from dysentery, beginning in the submucous tissue, but soon causing extensive destruction of the mucous membrane.

When intestinal catarrh becomes chronic, there are the usual changes in colour, which is often dark or even black from pigment; thickening and induration of tissues; with degenerative changes in the gland-structures. Chronic catarrh may give rise to ulceration; or it may result from this or some other organic change in the bowel.

SYMPTOMS.—Cases of simple enteric catarrh are characterised generally by uneasiness over the abdomen, with colicky and griping pains, especially about the umbilicus, where there may be a little tenderness, though pressure sometimes gives relief; formation of much gas in the intestines, causing gurgling and borborygmi; and diarrhœa, especially after taking anything, the stools becoming in some cases very numerous, being at first fæculent, but soon assuming a watery, irritating character. These may be the only symptoms, but as the stomach is often implicated at the same time, this is indicated by a red, furred, and dryish tongue, impaired appetite, thirst, and a tendency to nausea or vomiting. In duodenal catarrh jaundice is frequently observed, owing to the closure of the common bile-duct by the swollen membrane; and if the duodenum is solely involved, there is corresponding localised pain and tenderness, with constipation instead of diarrhœa. Occipital headache is also said to be common. If diarrhœa has been severe for any time, the stools are apt to become somewhat dysenteric in character, containing mucus and blood, especially if the large intestines are mainly implicated, when there may be much tenesmus and straining at stool.

The symptoms are more marked in proportion to the intensity of the inflammation, especially the pain and tenderness, and they are particularly severe in connection with irritant poisoning. Should there be any membranous deposit upon the mucous surface, shreds, larger patches, or even intestinal casts of this material may be expelled in the stools.

General symptoms are in some cases entirely absent, except, perhaps, some feeling of exhaustion from excessive diarrhœa. In the more severe forms of enteritis, pyrexia is observed, with languor, general depression, d headache. In children there is frequently high fever, with much ostration, a greatly distended abdomen, and aphthous stomatitis. metimes convulsions or coma set in, and death may result from this se, or from exhaustion. In cases of poisoning the general symptoms e grave, there being often a tendency to collapse; and the same thing occasionally observed in severe enteric catarrh from other causes, pecially in persons constitutionally weak, or who are the subjects of e chronic lowering disease.

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Owing to interference with digestion and nutrition, more or less wasting is commonly observed, as well as slight pyrexia in some cases, especially towards evening.

Diagnosis.—The chief affections for which the various forms of acute intestinal inflammation are liable to be mistaken are simple diarrhœa, or diseases attended with this symptom, especially typhoid fever and dysentery; intestinal colic; peritonitis; painful affections of the abdominal walls; and, in the case of typhlitis and its consequences, local inflammation and abscesses in the right iliac fossa due to other causes, or certain tumours.

There can be no doubt but that many ordinary cases of diarrhœa are the result of catarrh, and it is often impossible to separate them. The characteristic symptoms of typhoid fever and dysentery are usually sufficiently distinctive. Simple colic is recognised by the characters of the pain; absence of fever; and presence of constipation. Peritonitis is readily separated from mere catarrhal inflammation by the intensity of the pain and tenderness, constipation, great constitutional disturbance, and other symptoms; but as regards severe localised enteritis, it is by no means easy to distinguish between them. Indeed, in most instances the peritoneum is involved along with the other coats, and this is more evident if the pain and tenderness are marked, superficial, and extensive. Colicky pains are suggestive of inflammation of the more internal portion of the walls. It is important to bear in mind duodenal catarrh as a not uncommon cause of jaundice.

In cases of chronic catarrh the main point to determine is whether this is simple; or associated with ulceration or amyloid degeneration. The special characters of ulceration will be presently indicated. Lardaceous disease of the bowels is almost always preceded by distinct clinical evidences of other organs being affected; as well as by the known causes of, and constitutional condition accompanying this morbid state.

Prognosis.—Ordinary enteric catarrh usually ends favourably, but it may become chronic. If intense, however, or if it occurs in children, in very weak subjects, or as a complication of acute and chronic diseases, it may become highly dangerous and end fatally. The severe form of enteritis is extremely grave. Typhlitis is also necessarily attended with many dangers. Chronic catarrh, especially if long-established, is often very difficult to cure, and it adds to the gravity of other chronic diseases by interfering with the nutrition of the patient.

Treatment.—The remarks made with respect to diet in the case of stomach disorders apply with almost equal force to those affecting the intestines. In acute catarrh of the bowels, if there is anything causing irritation it is desirable to get rid of this by means of a dose of tincture of rhubarb, castor oil, or other simple aperient, or by an enema. As regards internal remedies, the most serviceable combination in my experience consists of bismuth, with alkalies, mucilage, and small doses of tincture of opium. An enema containing opium is also very useful after all irritant matters have been evacuated; and the various other remedies recommended for diarrhœa may be had recourse to if required. In duodenal catarrh it is necessary to give small doses of some saline aperient, such as sulphate with carbonate of magnesia, which may be ded by a dose of calomel. External applications over the abdomen, ially heat and moisture, are often beneficial. Ordinarily there is inly no necessity for removal of blood, but in the early stage of the serious forms of inflammation it may be permissible to apply a few hes, provided the patient is in a fit condition. When the inflammation is accompanied with obstruction, the main points in treatment to avoid giving purgatives; to administer opium freely, either by the uth, enema, or subcutaneous injection of morphia; to support the tient, especially by enemata; and to treat the prominent symptoms, pecially pain, nausea, vomiting, and tympanitis.

Typhlitis and its consequences need constant fomentation and oulticing; perhaps a few leeches in some cases; and opium internally. f an abscess forms, it should be encouraged towards the surface, and opened when the proper time arrives. If an accumulation can be felt in the cœcum, it may sometimes be squeezed out by gentle manipulation, but much care is necessary in practising this.

Chronic enteritis will probably require some of the more powerful astringents alluded to under diarrhœa. Powders containing carbonate of bismuth, gr. v—x, with Dover's powder, gr. iij—vi, act very beneficially in some cases. Tincture of steel is also a valuable drug in this complaint when given in full doses. In obstinate cases counter-irritation over some part of the abdomen, especially the right iliac fossa, by means of blisters, iodine, or croton-oil liniment, may prove of service.

CHAPTER XXXVIII.

DYSENTERY—BLOODY FLUX.

ETIOLOGY.—Dysentery occurs as an acute and chronic disease, and may assume a sporadic or epidemic character. Different views are held as to its immediate exciting cause, viz.:—1. That it is due to a malarial poison, originating in vegetable decomposition and rising from the soil. 2. That though primarily originating in this manner, it may be afterwards propagated from one individual to another by means of a contagious specific poison, conveyed, as some suppose, only by the stools, especially through their being mixed with drinking-water; or, as others believe, by all the excretions and exhalations. 3. That it is independent of any specific poison, and merely results from certain general causes which tend to produce intestinal congestion and inflammation, such as exposure to cold, especially to night chills and dews; errors in diet, especially want or improper quality of food; excessive use of salt meat; drinking impure water or irritating liquors; indulgence in excess of or in sour fruit. Those who regard the malady as *specific* consider the causes just mentioned as merely *predisposing*, or as aiding in propagating the poison, but it is highly probable that they may at all events excite the sporadic form. Amongst other *predisposing* and *propagating causes* are a hot and moist climate, especially during the seasons whe the nights become chilly, most cases occurring in the autumn and particularly after much exposure to night air; over-crowding and filth; bad ventilation, especially with exposure to emanations from any kind of decomposing organic matter; and physical exhaustion. Dysentery may accompany or follow certain diseases, particularly ague or remittent fever, scurvy, relapsing fever, cholera, or syphilis, and also the state of system resulting from the action of prolonged heat. Ague and chronic dysentery were not uncommonly met with together in the case of sailors admitted under my care at the Liverpool Northern Hospital; and occasionally the latter complaint accompanied scurvy. Chronic dysentery always has its origin in the acute form.

ANATOMICAL CHARACTERS AND PATHOLOGY.—In general terms dysentery may be said to be characterised by inflammation of the large intestines, ending in ulceration or gangrene; with exudation on the mucous surface. According to the view entertained as to the origin of the disease is the inflammation considered by different authorities as simple or specific. Niemeyer regarded it as of a diphtheritic nature. So diverse have been the descriptions given of the morbid appearances, that it has been found necessary to start theories as to difference of type, &c., in order to explain the want of agreement, and it seems highly probable that the constitutional state of the patient will materially influence the characters of the disease.

Usually only a portion of the large bowel is involved, especially the rectum and neighbouring part of the colon; sometimes the entire tract is affected, but the disease is then generally more advanced towards the lower end of the intestines. Occasionally it extends into the small intestines, even for a considerable distance, but this is usually observed only in scorbutic cases, or when patients are much debilitated.

In the early stages the chief appearances are considerable enlargement of the solitary glands (which has been regarded by most authorities as the primary lesion), and of the tubular glands; increased vascularisation, varying much in extent and intensity, but being especially marked around the glands; with some swelling and softening of the mucous membrane. The solitary glands form little rounded projections, and in many a minute spot can be detected, corresponding to the orifice. They are filled with a whitish exudation, containing abundant young cells. Some consider these prominences as at all events partly due to exudation outside the glands, and affirm that these are not specially involved in dysentery. An exudation also forms in the intertubular tissues and on the surface of the mucous membrane, of a diphtheritic nature. It covers the membrane more or less extensively and thickly, sometimes being uniform, but usually granular, often presenting an appearance like bran or sawdust, and being most abundant on the tops of mucous folds. At first the colour is greyish or yellowish-grey, but this is soon liable to many alterations from various causes. The material is opaque, of some consistence, and can be detached, leaving a more or less red surface underneath or evidences of extravasation of blood. It appears to consist of a fibrinous substance, with abundant granules nuclei, germs, epithelium cells, and young nucleated cells, some o which are elongated and fusiform, resulting mainly from proliferation Occasionally it undergoes a process of partial organization.

Ulceration appears chiefly to begin in connection with the enlarged lands, by a process of limited sloughing at the summit, the ulcer afterards spreading. Sometimes, however, several glands with the interening tissue are destroyed simultaneously; or the ulceration appears to e due occasionally to a process of disintegration of the exudation, ivolving at the same time the superficial part of the membrane. Very urely it originates in submucous accumulation of pus or other materials. t the outset most of but not all the ulcers are small, circular, with ounded edges; by extension they become larger and irregular, often aving a transverse direction, the margins being flattened, and the depth nd appearance of the surface varying greatly, so that in time the ulcers re altogether wanting in uniformity. Not unfrequently the floor ecomes covered with exudation. Now and then the coats are rapidly lestroyed, so as to lead to perforation. Should the disease terminate avourably, and cicatrization ensue, this generally takes place with little or no puckering, the edges becoming rounded and adhering to the base of the ulcer, a layer of lymph then extending over the surface and becoming organised. Now and then healing is attended with much thickening, irregularity, induration, and contraction, leading to serious results. There is no fresh formation of glands in the cicatrix.

The rapidity with which the changes described take place in the course of a case of dysentery differs much. In very severe cases the entire mucous membrane of the large intestine is speedily converted into a slough. The affected part is generally dilated, and contains very offensive materials similar to those passed in the stools, including fragments of exudation and often blood.

When the small intestines are implicated, the appearances which they present are redness; exudation on the surface, sometimes extensive; enlargement or, rarely, ulceration of Peyer's and the solitary glands. The stomach may be more or less inflamed. The other morbid conditions observed in different cases associated with dysentery are enlargement, redness, and softening of the mesocolic glands, and, in some forms, of the mesenteric; serous inflammations, especially of the peritoneum, corresponding to the affected part of the bowel or due to perforation; hepatic derangements, particularly inflammation ending in abscess; enlargement of the pancreas and spleen, the latter being in rare instances the seat of abscess; renal disease, with destruction of the epithelium; extensive bronchitis, lobular pneumonia, or pyæmic abscesses. The relation of hepatic abscess to dysentery has been much disputed. Some regard them as mere effects of the same cause, being independent of each other; others think the abscess is the consequence of the dysenteric ulceration, being produced by an extension of phlebitis, or, more probably, by the conveying of emboli and other deleterious substances. This complication seems to be much more common in hot climates.

When dysentery becomes chronic, the appearances presented are very diverse. Usually firm exudation forms between the coats, matting them together and causing much thickening and induration, so that the intestines feel very firm and solid, and pieces will sometimes stand on end. The colour of the mucous surface alters, becoming dirty brownish-grey, or in parts black, on account of pigment derived from altered blood. The exudation undergoes a certain degree of organization, and often forms thick, warty, adherent masses. The surface presents in some cases a bark-like aspect. Frequently, but by no means always, ulcers are observed, in every conceivable variety of stage and character, as well as cicatrices of former ulcers; some of these result from changes set up in the exudation, which extend into the tissue beneath. In some cases cicatricial bands and contractions alter greatly the calibre and form of the bowel, and sinuses may pervade its walls. In other instances there is extreme atrophy of the coats, including the glandular structures. An appearance of pseudo-ulceration may result from separation or cracking of the firm exudation, thus exposing the mucous surface, which is extremely red and irritable-looking.

SYMPTOMS.—Acute dysentery is presented in all grades of intensity, from a mild sporadic form to an epidemic of the most virulent type, but its symptoms are generally highly characteristic. Many cases, especially in temperate climates, begin with simple diarrhoea, slight colicky pains, thirst, loss of appetite, and some constitutional disturbance, the special symptoms setting in after a short interval; sometimes these are observed from the outset. A chill or rigor commonly ushers in the disease in severe cases.

The prominent local symptoms are griping pains in the abdomen, technically named *tormina*, irregular in site, but chiefly felt along the colon; often a sense of heat or burning along the colon and rectum, or, in grave cases, over the whole abdomen; tenderness, especially in the left iliac fossa; more or less tympanitis; tenesmus, indicated by a sensation of fulness, weight, bearing-down, or of the presence of a foreign body about the lower end of the rectum, with frequent or constant desire to defæcate, the act being accompanied with much straining; and the passage of peculiar stools. The morbid sensations differ greatly in their severity and constancy; in most cases they are paroxysmal, increasing until a stool is passed, by which they are temporarily relieved; sometimes, however, they become constant and most agonizing. The tenesmus is more marked when the lower portion of the rectum is implicated. At first the stools are often semi-fæculent or consist of hard scybalæ, but they soon assume the dysenteric characters, becoming scanty, slimy or gelatinous from the presence of mucus, bloody, with a most offensive and characteristic odour. Usually the different matters are more or less mixed, the more so the higher the disease is situated, when they also contain abundant depraved biliary secretions. If the rectum is chiefly affected, the blood is less intimately incorporated, while the stools are more muciform (Maclean). Not uncommonly scybalæ are passed from time to time, covered with mucus and blood. Mild cases do not go beyond this, but in bad forms of the disease in tropical countries the stools change in their characters, becoming muddy-looking; brownish, brownish-red, or even black; often watery and copious; and containing shreds or masses of membrane, which look like "washed raw meat." Sometimes a large quantity of pure blood is passed, or sloughs of the mucous membrane. At this time the odour becomes intolerable, and it has been compared to carrion, or to the "smell of a macerating tub in the dissecting-room." Dr. Goodeve has recommended that the stools should be washed with water, so as to leave nothing behind but the sediment, which contains the products of the intestinal disease, and these can then be examined, and the condition of the bowel be thus more accurately determined. Chemically the stools yield a large proportion of albumen, even when there is little or no visible blood. They are alkaline, and contain much carbonate of ammonia. Microscopically they present abundant epithelium cells, blood, exudation and pus cells, and remnants of the membrane. Peculiar cells and other bodies have been described.

There are other indications of digestive disturbances, in the way of anorexia; thirst, which may be intense; furred tongue; and sometimes nausea and vomiting. There may be irritability of the bladder, with strangury; or on the other hand paralysis with retention when the rectum is much affected. The urine is generally high-coloured, scanty, and prone to rapid decomposition; in low forms it becomes very offensive; occasionally it is suppressed. In females irritation of the vagina is complained of in some cases.

The constitutional symptoms in the less severe cases are only those indicative of slight pyrexia. In the graver forms these are more marked, there being at the same time much nervous depression and irritability, with an anxious, distressed expression of countenance. When tending towards a fatal issue, and in the most severe types of the disease almost from the first, the symptoms assume an adynamic or typhoid character, with great prostration, the tongue becoming red, dry, brown, or blackish, with sordes on the teeth; the pulse very rapid, feeble, or irregular; while the tympanitis increases; the painful sensations cease; there is persistent hiccup; and low nervous symptoms set in, ending in' coma. In the malignant type of dysentery speedy collapse occurs, resembling that of cholera, with hæmorrhage from the mouth and nose.

Varieties.—Several varieties of acute dysentery have been described, according to the severity and nature of the symptoms present, and the other conditions with which it is associated. The chief are named mild; sthenic; asthenic or typhoid; bilious; malarious, characterised by the periodicity of the febrile paroxysms, much gastric irritability, the serous character of the stools from the first, which contain but little blood, the greater frequency of hepatic complications, and the efficiency of quinine in treatment (Maclean); malignant; scorbutic.

Duration and Terminations.—Dysentery lasts a very variable time, and it may terminate in death or recovery, or become chronic. Death may happen within two days, or not for two or three weeks or more; it results either from collapse, the typhoid state, gradual exhaustion in prolonged cases, hæmorrhage, or occasionally perforation. A favourable turn is indicated by the stools becoming fæculent and losing their dysenteric characters; cessation of the painful sensations; diminution of fever; and improvement in strength, in the state of the pulse, and in the expression.

Chronic Dysentery is a most troublesome complaint, but the precise symptoms do not entirely depend upon the state of the bowels, being often modified by some constitutional diathesis, or by a diseased condition of some other organ. The tenesmus and other morbid sensations are less marked than in the acute form, or may be absent. In some cases control over the sphincter ani becomes completely lost. The

exhaustion : pyrexia, tending towards the hectic ty
and loss of hair. Death often results from gradua

Diagnosis.—The symptoms of dysentery just
characteristic, and an examination of the stools
sensations of the patient, and the general sympton
doubt as to the nature of the case. All authoritie
the peculiar odour of the evacuations. The fact
epidemic is also of service in diagnosis. Dyse
set in in cases of long-continued intestinal catar
be mistaken for true dysentery. I have also kn
of the rectum simulate chronic dysentery.

Prognosis.—This will depend upon whether t
or epidemic ; the severity of the attack ; the cha
the general condition of the patient ; the progress
presence or absence of serious complications, espe
mic dysentery, particularly when of a low typ
Signs of collapse or adynamia are of course ve
among specially bad signs are mentioned gangr
hæmorrhage ; subsidence of the pain while the
becoming worse ; and suppression of urine. A
evacuations to their normal state is highly favourabl
may often be improved by appropriate manageme
tolerably extensive experience of this disease at th
Hospital. Prolonged cases, however, are not m
treatment.

Treatment.—Early attention is of extreme
dysentery, and the patient should immediately tak
radic form resulting from a chill, some authorities
warm, vapour, or hot-air bath at the outset. In s
castor oil with laudanum is beneficial at first. T
in this disease, and one which seems to have alm

some days. It is well to administer 10 or 12 grains at bed-time for ight or two after the stools appear healthy. Some authorities recom- d it to be administered more frequently in smaller quantities: and er employ ʒ½ to ʒj every four or five hours, but these large doses unnecessary, and are liable to produce much depression. It has been advocated to introduce ipecacuanha by enema, but this is jectionable. Many consider it desirable to make the stomach tolerant the medicine beforehand, by means of a full dose of laudanum or ley's solution, or a few drops of chloroform; or by applying anodyne ltices over the epigastrium. Perhaps a small subcutaneous injection morphia might answer this purpose. Dr. Maclean states, however, frequently no sedative is required, and that if vomiting is unmanage- le after ipecacuanha, hepatic complication or overcharging of the tem with malaria should be suspected.

Local applications over the abdomen are very useful, especially warm ltices; fomentations sprinkled with turpentine, laudanum, or chloro- m; and sinapisms. Symptomatic treatment is often required. The ove applications will usually afford relief to the painful sensations, but the tenesmus is very severe, warm emollient enemata or a suppository opium may be tried. Of course diet requires the utmost attention. ef-tea, soups, arrowroot, sago, raw white of egg, jellies, and such articles, uld be given in small quantities between the periods of administration the ipecacuanha. Stimulants are to be avoided generally, but in the hoid condition they are certainly required. As the patient improves, must the food be cautiously altered. Hygienic measures also demand ry care, especially as regards the immediate disinfection and destruc- n of the evacuations.

The evidence in favour of the treatment thus far considered seems te conclusive; but in a treatise of this kind it is necessary to men- n the other chief methods advocated. These are—1. By astringents, ecially opium. These are useful if diarrhœa holds on after the stools re lost their dysenteric characters. 2. By purgatives, such as castor , sulphate of magnesia, or cream of tartar. 3. By venesection and omel. Calomel has been given in large quantities; or in doses of i to gr. ij with opium every three or four hours. This treatment had ter be avoided, and the only removal of blood which seems justi- ble is by the application of a few leeches in the left iliac fossa, uld the pain be very intense and the state of the patient be favour- le. 4. By a combination of blue pill, opium, and ipecacuanha. By antiseptics. It is important to note that there are two forms of sentery which require a modification of treatment, viz., the mala- us and the scorbutic. The former calls for full doses of quinine, ernating with the ipecacuanha: the latter for fresh fruits, and Maclean d others recommend Bael very highly in these cases.

In the management of chronic dysentery the most essential matters : to regulate the diet; and attend to sanitary measures for improving : health. Mr. Harry Leach has found from his experience at the eadnought Hospital that rest for the bowels and body, with a bland ritious diet, are mainly to be relied upon for a cure, and he considers t drugs are of little or no use. Certainly I think I have seen much efit follow the administration of Dover's powder, gr. iv—v three or four times daily; and still more from full doses of tincture of steel during the day, with a little Dover's powder night and morning. Dr. Reginald Thompson found ipecacuanha (gr.iij—v every 3 hours) most serviceable. The stronger astringents, such as gallic acid, acetate of lead, sulphate of copper, or nitrate of silver are often employed, but they have never been of much permanent service in my experience. Small doses of bichloride of mercury have also been recommended. A dose of castor oil with a little opium may be taken from time to time. Opium enemata are sometimes beneficial, especially for relieving unpleasant sensations. Other measures recommended for this purpose are the use of a water compress over the anus, or gentle douching of this part; wearing a bandage or a water-belt over the abdomen; friction over the abdomen with anodyne or irritant liniments; or the application of a blister over the left iliac fossa. Among the hygienic matters needing special attention are change of air, particularly speedy removal from a malarial district, or from a tropical country to Europe; the wearing of warm clothing; and the use of cold baths with friction afterwards, if they are well borne. Some employ baths containing dilute nitro-hydrochloric acid. If there is any malarial, scorbutic, or other morbid condition of the system, the treatment must be modified accordingly. Any acute or sub-acute exacerbation of symptoms calls for complete rest and the immediate administration of ipecacuanha.

CHAPTER XXXIX.

INTESTINAL NEW FORMATIONS AND ULCERATIONS.

IT appears desirable to give a summary of the morbid conditi
coming under the above headings, with some general remarks on t
clinical features; and to consider briefly such of the more importa
them as have not yet been noticed. The reason for treating new fo
tions and ulcerations together is that the former often originate
latter.

NEW FORMATIONS.—These include:—1. Cancer. 2. Tubercle
other materials formed in the so-called tubercular disease. 3. Typ
deposit. 4. Albuminoid infiltration. 5. Occasionally fibroid inf
tion. 6. Rarely villous growths; polypi; adipose, cystic, erectil
glandular tumours; and calcareous deposits. The immediate symp
due to these, if any, are either indicative of obstruction of the bo
or of irritation and catarrh of its mucous membrane. Local pain
tenderness may or may not be complained of. Frequently there
constitutional symptoms, or symptoms associated with other or
which aid in determining the nature of the disease. In some
physical examination may detect a growth.

ULCERATIONS.—The ulcers met with in the intestines may be
arranged:—I. *Non-specific*. 1. Those due to direct injury of
mucous surface by foreign bodies, calculi, hardened fæces, and che

structive agents, including probably acrid secretions. 2. Those originating in inflammation. Simple catarrh, especially if of long duration, may end in ulceration, either catarrhal or follicular. The separation of croupous or diphtheritic deposit may also cause it. Rarely it results from submucous suppuration or gangrene. 3. Perforating ulcer. An ulcer similar to the gastric variety is now and then observed in the duodenum. The form associated with burns and scalds also needs to be mentioned. 4. Ulceration from some morbid condition outside the bowel making its way into the interior, which is very rare.

II. *Specific.* 1. Typhoid. 2. Tubercular. 3. Dysenteric. 4. Cancerous. 5. Syphilitic probably. 6. Ulcers due to albuminoid disease.

Symptoms.—The local symptoms suggestive of ulceration of the bowels are constant colicky pains; localised tenderness, especially if the disease is extensive or if the large intestine is involved; and persistent diarrhœa, the stools often having very unhealthy characters, sometimes resembling pea-soup or gruel, and being unusually fœtid, or containing blood, mucus, or pus. Cases come under observation, however, in which constipation is the only conspicuous symptom. If the disease is limited to the small intestines, especially their upper part, the diarrhœa is of a simple kind; and it is usually only in such a case that constipation is observed. If the large bowel is much implicated, especially the rectum, the symptoms tend to be dysenteric. The diarrhœa is chiefly due to catarrh set up by the ulceration. The circumstances under which this occurs will generally aid much in indicating the event, as in typhoid fever, dysentery, or phthisis. When chronic, it is in some instances very difficult to make out positively that there is ulceration, and to distinguish this morbid condition from mere chronic catarrh, but it may be strongly suspected should there be diarrhœa, either constant or easily excited, or not amenable to treatment, especially if the stools are very unhealthy. The constitutional condition often affords aid in diagnosis. Ulceration itself tends to excite more or less pyrexia, which in chronic cases is frequently of a hectic type; and also leads to impaired nutrition, inducing emaciation, debility, and anæmia. It may cause peritonitis, perforation, or serious hæmorrhage; or stricture may result from cicatrisation.

Treatment.—It need scarcely be remarked that attention to diet is all-important in treating ulceration of the bowels. At the same time it must be so ordered as to promote the nutrition of the patient, and to be adapted for any morbid diathesis present. Rest of the body is highly beneficial, and of course the affected part should be kept as quiet as possible. This object is best gained by administering opium in some form, if it is admissible; if not, other sedatives must be given, especially belladonna. Diarrhœa must be controlled by the various astringents along with opium. The chief remedies which are believed directly to promote the healing of ulcers are nitrate of silver, sulphate of copper, acetate of lead, oxide of zinc, and bismuth salts. Much benefit often follows the use of carbonate of bismuth with Dover's powder in the ulceration which occurs during phthisis, as well as in other forms. It is not desirable to encourage long-continued constipation, but should this symptom be present, much care is necessary in the employment of aperients, which must be of the mildest kind; simple enemata are very useful. Tonics are often indicated, especially preparations of iron. is well for the patient to wear a warm bandage round the abdomen, p perly applied. Local applications may be required from time to t Some recommend an occasional blister over the right iliac fossa.

CANCER OF THE INTESTINES.

ANATOMICAL CHARACTERS.—Primary cancer of the intestines is v rare, and when the bowel is involved, which is not common, it generally by extension, especially from the peritoneum and subpe neal tissue, though even then the muscular and mucous coats o escape. The large intestines, particularly the rectum and sigmoid fle are far more frequently attacked than the small, of which the duode is the part usually implicated. All varieties are met with, even m nosis, but scirrhus is the ordinary form. Epithelioma has in rare stances invaded the rectum by extension from the uterus and va Sometimes encephaloid arises on a basis of scirrhus, when the l reaches the interior of the bowel.

There are the usual variations in the characters, arrangement, extent of the cancer. It may be limited to one part, occasionally f ing a rounded or lobulated tumour; widely spread; or in scatte nodules, which are often secondary to some more localized and ex sive deposit. In the progress of the disease the coats become ma together, and ultimately, if the mucous membrane is implicated, ulce tion or sloughing ensues, the ulcer being either smooth and excava with thickened, indurated, and tolerably regular edges; or presenting an irregular aspect, with fungous growths along the floor and margins, often very vascular, and liable to bleed freely. Perforation may take place, not uncommonly into some hollow organ. Frequently the affected part of the intestine is much constricted, while the part above is dilated and its muscular coat hypertrophied, the portion beyond being contracted.

SYMPTOMS.—The following are the clinical phenomena to be looked for as indicative of cancer of the bowels:—localized pain in some part of the abdomen, either constant or at intervals, dull and aching or lancinating, with tenderness; habitual constipation, with abnormal shape and size of the stools, ultimately culminating in complete obstruction; the physical signs of a tumour deep in the abdomen, hard, irregular, and tender, at first movable, but afterwards fixed; with marked and rapid wasting and loss of strength, as well as signs of the cancerous cachexia, or of cancer in other parts. In some instances, however, there is diarrhœa, especially after ulceration sets in, when the stools become extremely offensive, and occasionally symptoms of obstruction disappear, owing to a mass of cancer sloughing or ulcerating away. When the rectum is affected, the pain is referred to the sacrum, shooting thence towards the thighs and back, being often extremely severe. Symptoms of a dysenteric character are then also generally complained of. Examination per rectum may reveal the disease. Cancer is liable to give rise to abundant hæmorrhage; or it may lead to intestinal perforation, or to extensive destruction of neighbouring organs. Death is usually gradual, but may be hastened by complete obstruction, perforation, peritonitis, or hæmorrhage.

EATMENT.—Usually all that can be done is to treat symptoms. In
instances life may be prolonged by making an opening into the
above the seat of the disease, if this is low down.

BERCLE OF THE INTESTINES.—TUBERCULAR ULCERATION.— SCROFULOUS DISEASE OF THE INTESTINES.

OLOGY AND PATHOLOGY.—There are the same differences of
n as to the pathology of the so-called tubercular disease and
ion of the intestines, as in the case of other affections of this
Some explain all the phenomena by the formation of tubercle, and
sequent destruction with that of the involved tissues. Others
er that true tubercle is but rarely formed, and that the appear-
are usually due to the proliferation of cells in the glands, which
e caseous and break down, ultimately destroying the over-lying
ane and forming ulcers, which spread by further cell-formation
sintegration in the surrounding mucous and submucous tissues.
yer acknowledged that secondary tubercle is met with sometimes
immediate vicinity of ulcers, especially in the peritoneum corre-
ng to these, but believed that as a primary condition it is ex-
y rare.

ertainly is most difficult to determine what is tubercle and what
in the intestines. Niemeyer stated that it would be best recog-
by its being deposited in separate nodules or groups where there
Peyer's patches.

localized affection, implicating at the same time the mesenteric
, this complaint is by far most frequent in scrofulous children; in
it almost always occurs secondarily to pulmonary phthisis.

TOMICAL CHARACTERS.—In the great majority of cases the soli-
nd Peyer's glands are chiefly implicated, and hence the morbid
ances are observed in the lower portion of the small intestines, or
st advanced there, while they gradually cease towards the jeju-
Occasionally they extend into this portion, or very rarely even
duodenum. Not uncommonly the cæcum, appendix vermifor-
nd colon are involved, to which sometimes the disease is chiefly
rely limited. The area affected varies greatly, and generally the
l changes are visible in different stages in different parts. At first
rm, grey, projecting nodules are seen, which become yellow and
and break down, producing small circular ulcers. Apart from
tuation, it appears impossible to distinguish between the granula-
f tubercle and those due to enlarged glands. The ulcers soon
e larger, however, either by infiltration and destruction around,
g tissues far beyond the glands, or by coalescence, and they
o present special characters, in which condition they are generally
These characters are more or less irregularity in shape; a trans-
lirection as regards the bowel, the ulcer spreading mainly in the
of the vessels, and sometimes completely surrounding the gut
band of ulceration ½ to 1 inch or more wide; thickening, irregu-
and induration of the margins and floor, the latter presenting
; and but little proneness to heal. Imperfect or partial cicatri-
s, however, often observed, with the formation of a dense tissue,

sometimes pigmented, the edges being drawn together, and thus contraction and irregularity of the gut is produced, or rarely complete stricture.

During the process of ulceration local peritonitis is set up, causing thickening and adhesions, and thus all the coats are frequently destroyed without the occurrence of any symptoms of perforation, or sometimes a communication is formed between two portions of the intestine. Secondary tubercles are often observed in the affected portion of the peritoneum, which may spread along the lymphatics to the mesentery. The floor of the ulcers not uncommonly presents evidences of hæmorrhage. Niemeyer stated that true tubercular ulcers are not so extensive as those of non-tubercular origin.

Symptoms.—Tubercular disease of the bowels is indicated in the child by the occurrence of persistent or frequent symptoms of intestinal irritation and catarrh; associated with the general symptoms of tuberculosis, much wasting, and retarded development. In the adult ulceration may be suspected if in the course of phthisis the symptoms characteristic of this condition arise, especially if diarrhœa sets in which will not yield to proper treatment, and if there is localized tenderness; but it is in these cases that constipation is most frequently observed, this being sometimes due to peritonitis, while on the other hand diarrhœa is often dependent upon other causes.

Treatment has been sufficiently indicated when speaking of ulceration in general.

Albuminoid Infiltration.

Anatomical Characters.—The entire alimentary canal may become the seat of albuminoid disease. In the intestines it begins in the small vessels of the villi, and then spreads to the other vessels; in time it involves the glands, the entire villi, and ultimately the whole of the mucous coat, or even the submucous and muscular coats. Extensive atrophy of the villi may follow. The morbid material is liable to undergo disintegration, forming a yellow substance; and finally small ulcers are sometimes formed, corresponding to the glands. It is very difficult in the early stages to recognise this morbid condition. The surface appears pale, anæmic, and glistening or shining, but the iodine test is necessary to reveal the deposit, which it shows to be in the villi and small vessels. In more advanced cases the appearances are more characteristic, and enlarged glands or ulcers are seen, especially corresponding to Peyer's or the solitary glands. Peyer's patches sometimes present a reticulated aspect.

Symptoms.—Should there be evidences of albuminoid disease of other organs, the same condition of the alimentary canal may be fairly diagnosed, if obstinate diarrhœa should set in, with liquid stools, especially if these are greenish or otherwise unhealthy. Hæmorrhage is liable to occur in the later stages, and it may be quite independent of ulceration. Implication of the stomach is indicated by persistent vomiting, with signs of imperfect digestion. When the alimentary canal is affected with albuminoid disease, nutrition is necessarily gravely interfered with.

Treatment.—The treatment is that required for albuminoid disease in general, and for gastric or intestinal catarrh and ulceration.

Y AND PATHOLOGY.—The numerous causes of obstruction of els may be ranged under certain heads, viz. :—1. Accumulations interior, of hard fæces; indigestible matters, either taken in the ch as oat-cakes, rice, seeds or stones of fruits, or swallowed pur- especially by hysterical girls and children, *e.g.*, string, hair, dirt, ertain medicines which are apt to form concretions if taken for ne in quantity, viz., magnesia and sequioxide of iron; masses of large or numerous agglomerated gall-stones; concretions of te or carbonate of lime. Gall-stones usually lodge high up in ll intestines. 2. Stricture resulting from morbid changes in the the bowels, viz. :—*a.* Congenital constriction, chiefly about the rely in the duodenum. *b.* Cicatrization of an ulcer, especially as passed round the gut, or has been very extensive. *c.* Fibroid on of the walls. *d.* Cancer. This class of causes is by far most n in connection with the large intestines. 3. Compression, tion, or traction due to morbid conditions external to the intes- Dr. Hilton Fagge has drawn particular attention to some of uses, which include pressure by displaced or enlarged organs nours of various kinds, particularly in connection with the uterus ries; by growths or accumulations in the intestine itself; or by adhesions, agglutinations, or deposits in the peritoneum, some- ter simple peritonitis, but more frequently associated with tubercle er. These latter may lead to distinct constriction, or may cause n bend or twist in the intestines; but usually they merely impede staltic action, either by compressing the bowel somewhat for derable extent, binding it down, exerting traction upon it, or together several coils. Hence materials collect above, which on the portion below, ultimately inducing complete obstruction; requently aided by a certain degree of spasm. These causes affect the small intestines. 4. Strangulation or incarceration, coming under this head is *intus-susception*, *invagination*, or *volvulus*, in which one portion of the intestine is prolapsed into that next below. Another variety is named *torsion* or *rotation*, in which the bowel with its attached mesentery is twisted, though Dr. Bristowe considers that this twisting is in many cases not the cause of obstruction, but the effect of enteritis, which has been the primary mischief. *Prolapsus ani* also ranges under this group, though it scarcely ever leads to complete obstruction. As very rare conditions have been mentioned sacculation of a part of the bowel; and hernia of the mucous membrane through the other coats. 6. Spasm or paralysis of the muscular coat. Either of these conditions may aid in inducing obstruction; or now and then possibly it may be the sole cause.

With regard to the determining cause of intus-susception a few remarks are necessary. It depends upon the peristaltic action of the intestines, and is supposed to be chiefly the consequence of undue dilatation of a portion of bowel towards which the wave of contraction is advancing, from accumulation of gas or any other cause; and to this portion being fixed, so that the part above is driven into it by its own
contraction. In many cases some violent exertion in which the muscle
of the abdominal walls partake determines the occurrence of intus-
susception. It has also been stated to be originated by worms o
polypi, and to be frequent in connection with chronic diarrhœa. Onc
it has started, the invagination increases by the continuance of the peri
taltic action, by which more bowel is driven in from above, at the sam
time the outer tube of intestine being inverted. Some of the oth
forms of sudden obstruction may be also immediately caused by viole
effort.

Sex and age require notice as important predisposing causes of certa
varieties of obstruction. That resulting from impaction of gall-stones is
far most frequent late in life and in females. Strictures are more comm
in males, and after middle life. Internal strangulation does not of
occur under 30 years of age, except that form due to adhesions of
appendix vermiformis or of diverticula, which is observed in young
sons most frequently, and chiefly in males. Ileo-cœcal intus-suscept
is remarkable for its frequency in children, but in the ileum or jejun
it is almost limited to adults; on the whole it is twice more comn
among males.

Anatomical Characters.—The appearances met with after de
in cases of intestinal obstruction necessarily vary much according to
condition upon which it depends. Only *intus-susception* calls for spe
description. By far the most common form of invagination is tha
which the ileo-cœcal orifice descends into the cœcum, and then pa
on into the colon, bringing down more and more of the ileum. I
not very uncommon in the ileum or colon, but is rarely observed in
jejunum or rectum. Very exceptionally the end of the ileum pa
through the ileo-cœcal opening, the lips of the latter not being displa
The portion of intestine which is the seat of invagination presents th
layers, arranged concentrically; the most internal is the part which
descended, the outer one is the sheath or intus-suscipiens, and
middle layer unites these, being derived from the continued involut
of the sheath, and its surfaces are necessarily reversed, so that its ser

coat is in contact with that of the internal layer, and its mucous coat with that of the external, while the mesentery belonging to the middle and internal layers is drawn in and lies between them. This exercises unilateral traction, whereby the intus-suscepted portion is curved, with the concavity towards the involved mesentery, and its lower opening looks towards some part of the wall of the outer tube, being elongated and fissure-like. The affected portions of bowel are more or less convoluted or twisted, especially the middle layer.

The extent of the invagination varies considerably, ranging from an inch or two to three or four feet or even much more than this, especially in the ileo-cœcal variety; not uncommonly short intus-susceptions are found in the small intestine after death, which are easily reduced, and have given rise to no symptoms during life; some believe that these are originated during the act of dying, or even post-mortem. In the great majority of cases, however long the intus-suscepted portion may be, its lower end continues the same as at the commencement. Ultimately it may reach the anus or even protrude through this.

Certain important events are liable to happen in connection with the invaginated portion of intestine. 1. Of course the inner layers are more or less compressed by the outer tube, especially at the entrance or neck of the invagination; the canal is therefore narrowed, but not usually completely closed at first. 2. The return of blood is interfered with, and hence results mechanical congestion, often intense, leading to œdema of the tissues, or even escape of blood between the mucous surfaces or into the intestinal canal, where it is mixed with serum; consequently thickening and swelling arise, which increase the obstruction. 3. Soon peritonitis is set up over the contiguous surfaces of the serous coat, with exudation of lymph, and this may spread and become general, or the formation of adhesions may limit the further descent of intestine. 4. Violent enteritis is excited, and ultimately, owing to this condition and the congestion, gangrene not uncommonly results. 5. In some cases the mortified portion becomes detached, either completely or in part, and either in one mass or in fragments, and is expelled per anum. The dangers of this separation may be prevented by adhesions having formed between the top of the outer tube and the intestine above; but if these are not sufficiently firm, the structures give way, with the escape of the intestinal contents into the peritoneum. If the bowel is expelled and adhesions are complete, recovery may follow, but there is still a further danger of a stricture forming at the point of union; or sometimes only a part of the invaginated bowel comes away, while the upper portion remains and becomes adherent to the surrounding tube, and thus there is more or less permanent obstruction. The rapidity with which the changes above described are set up depends on the severity of the compression, and therefore upon the part of the bowel involved. They are much more rapid in connection with the small intestines than the large, but especially when the ileum passes through the ileo-cœcal orifice without disturbing it.

The portion of intestine above that which is intus-suscepted acts with undue vigour and thus aggravates the mischief, while at the same time it drives on some of the contents of the bowel. For a time also the affected part itself contracts. By the pressure of its lower end against the wall of the outer sheath, ulceration of the mucous surface is often excited. Very rarely double intus-susception has been observed.

Any sudden constriction will necessarily lead to congestion of the bowel and its consequences; inflammation, involving also the peritoneum; and ultimately to gangrene and perforation if the constriction is not relieved. In prolonged cases the part of intestine above an obstruction becomes much dilated, elongated, and hypertrophied, though these appearances are not always most marked directly above the impediment, while fæces and other matters accumulate, giving rise to catarrh or ulceration; the distal portion is contracted, empty, and atrophied.

Symptoms.—The direct clinical phenomena which in the first instance indicate complete obstruction of the bowel, from whatever cause, may be stated generally as absolute constipation, usually accompanied with colicky pains, often severe; increased peristaltic movements of the intestines; abundant formation of gas, leading to tympanitis and borborygmi; nausea and vomiting, the latter ultimately becoming stercoraceous or fæcal. Not uncommonly physical examination of the abdomen and rectum reveals some abnormal condition. In many cases symptoms indicative of severe enteritis, peritonitis, or perforation are subsequently developed. There are some circumstances which have an important influence on the clinical history of obstruction, especially the pathological conditions to which it is due; and its seat. Practically cases may be divided into two classes, viz., 1. Those in which the obstruction is gradual; 2. Those in which it occurs suddenly. In the former class of cases there will have been constipation for a variable period, sometimes alternating with diarrhœa, often with alteration in the shape and size of the solid stools; colicky pains; nausea and vomiting from time to time, and other digestive disturbances; with perhaps occasional signs of complete temporary closure of the bowels; or there may be physical signs of some mechanical obstruction. These cases may terminate slowly by asthenia; or culminate in a sudden attack of absolute stoppage of the bowels. The pain associated with obstruction is at first of a griping character, in some forms being sudden and severe, frequently starting from about the umbilicus, but it may radiate from some other locality which corresponds to the seat of the disease; after a time peritonitic pain not uncommonly supervenes. Absolute constipation is not an invariable symptom, for when the small intestine is implicated, its liquid contents can pass along unless there is complete closure, and the same thing may happen when intus-susception affects the large intestine; further, fæces contained in the bowels below an obstruction are often expelled. Occasionally blood and mucus are discharged, especially in invagination of the large bowel. Vomiting is more easily excited and more severe the nearer the stoppage is to the stomach. At first it is sympathetic in most cases, but soon the rejected matters have a distinctly fæcal odour, and present an appearance like pea-soup, consisting of materials which have either flowed back into the stomach from the bowels, or been forced by anti-peristaltic action or by external pressure. In some instances there is more or less suppression of urine, especially if the obstruction is high up, which is most probably a sympathetic derangement.

Diagnosis.—The further elucidation of the clinical history of these

ll be best aided by considering the points on which a diagnosis
ed. This has to determine, first, the existence of an obstruction
cause; secondly, its situation.

nducting the examination the following course may be adopted:
e age and sex should be noted, the influence of these as pre-
g causes of different varieties of obstruction being borne in
2. Certain questions in the past history of the patient should be
enquired into, viz., whether articles have been taken, either in
or in any other way, which might form concretions in the bowels;
ual state of the bowels; and if there is any history of previous
l ulceration, peritonitis, passage of gall-stones, or of uterine
nent or other condition which might give rise to pressure.
peculiar constitutional condition must be observed, and this
rd some aid, as, for instance, by indicating the cancerous
; phthisis, which is liable to be attended with ulceration and its
nces, or tubercular peritonitis; chronic dysentery; or hysteria,
ction with which accumulations of fæces are common, and
paralysis may occur. 4. As regards the history of the attack
hould be ascertained whether it has been gradual or sudden
et, and how long it has lasted; if the former, what the state of
ls has been, if any peculiar alteration in the stools has been
or if there have been previous attacks of complete obstruction
ve yielded to treatment; if the latter, whether the attack can
to anything having been swallowed, or to any sudden effort or
se, and if it has commenced with severe localized pain. 5. The
cal and general symptoms must of course be carefully noted,
as indicating simple obstruction, partial or complete; or in
enteritis or peritonitis; and also the rapidity with which sterco-
omiting sets in. 6. Careful *physical examination* is essential.
rms of hernia must be thoroughly sought after. *b.* Any con-
r distension of the abdomen, either general or local, must be
view being also taken from behind; in the early stages this may
h in fixing upon the seat of any obstruction. *c.* The situation
be partly determined in some cases by observing the situation
olent peristaltic movements in the intestines. *d.* Among the
ortant conditions discoverable by satisfactory investigation of
nen, which may also point to the situation of a stricture, are
tions, including impacted gall-stones, the onward progress of
n occasionally be traced; tumours of various kinds, either
o or associated with the intestines; and intus-susception. It
emarked, however, that even when these conditions exist, it is
reasons frequently difficult or impossible to detect them.
nation per rectum by the finger, hand, or bougie is often most
e. The amount of fluid or air which can be injected per
been stated, especially by the late Dr. Brinton, to aid mate-
fixing upon the seat of any stoppage, but this must be by no
plicitly relied upon. *f.* Of course, should anything be vomited
by stool, the materials thus discharged should be properly

7. In any doubtful case it is necessary to watch the progress
its clinical course, rapidity, and termination, and this may
d considerable assistance in diagnosis.

to set up violent enteritis, while the course of the
rapid. 2. Strictures and compressions of the bo
together. They are usually chronic in their prog
tion being preceded by gradually increasing c
interrupted by attacks of diarrhœa; diminution
shape of the stools, should a stricture be near the
liability to colicky pains, sickness, and other diges
interference with nutrition. From time to time a
of temporary complete obstruction. There may
cause; or physical signs may be detected, in
condition likely to give rise to stricture or con
these cases linger a long while, even after there is
bowels. Now and then, however, symptoms of
suddenly without any particular previous sympto
tis or peritonitis. Possibly some accumulation at
then be the immediate cause of the symptoms.
rise to rapid and absolute obstruction; followe
severe enteritis, or even gangrene of the intestines
tonitis. If not relieved their issue is quickly
cases can only be determined by exclusion, and
be guessed at. A previous history of peritonitis
immediate attack is often due to some violent e
ception is also sudden in its onset, as a rule,
pain, more or less violent, usually referred to
Subsequently there are colicky pains from time
nary signs of obstruction, followed by those of e
The other important diagnostic evidences of invag
of blood per anum, in some cases mixed with n
tissues; the detection of a "sausage-shaped" tu
corresponding to some part in the intestine, prese
ments, and altering as the case progresses in its
shape; and the end of the intus-suscepted portion
examination through the anus, or more or less of

n the account of the morbid anatomy. 5. It is scarcely
to indicate the characters of obstruction from spasm or
the muscular coat. The occurrence of chronic constipation
ical female, ending in complete obstruction, might suggest
iough probably the previous accumulation of fæces actually
ie obstruction. It generally yields to treatment.
IS.—Without entering into details, it will be evident that all
bstruction of the bowels are exceedingly dangerous. The
y fatal are strangulations and intus-susceptions. The chronic
liable at any moment to end in complete closure. Accumu-
often be got rid of, and thus recovery be brought about.
NT.—This must be considered separately, according as the
is chronic and gradual in its progress; or sudden and

: cases the main principles are to regulate the diet strictly,
y liquid or pultaceous, highly digestible, and nutritious
oderate quantities; to endeavour to keep the bowels acting
for which purpose mild enemata answer best, at the same
g the use of strong purgatives; to remove, if possible, any-
; compression, as well as accumulations; to support the
the patient and improve the general condition; to treat
symptoms referable to the digestive organs; and, in appro-
to have recourse to certain operations.
ere be a stricture in the rectum, it may often be dilated suc-
the cautious use of the bougie. In certain instances also
e to make an artificial anus above an obstruction, as described
orks, which may prolong life considerably.
f acute obstruction, from whatever cause, a matter of prime
is not on any account to excite the intestines by giving
gatives. It is allowable to use enemata carefully, so as to
: bowel below the seat of obstruction. Of course little or
uld be taken by the mouth, and soon the smallest quantity
ely rejected; therefore all the necessary support, including
hen required, must be administered per rectum, and fre-
siderable quantities of these are needed. The patient may
d to suck ice. The most important internal remedy is
ll doses; or subcutaneous injection of morphia may be
Belladonna is also highly recommended, or this drug com-
pium. In the treatment of intus-susception tobacco has
yed, usually in the form of an enema of its infusion, but it
ous remedy. External applications of dry heat, poultices,
s, turpentine stupes, or sinapisms, are very serviceable.
nd other symptoms call for the usual remedies for their
he case of intus-susception, the gradual injection of a large
liquid or air per anum has been frequently practised, and
vith benefit.
tion of an operation presents itself in many of these cases.
there is any evident or suspected hernia, surgical interference
. Another operation which might be indicated, and which
ccessfully accomplished, consists in opening the abdomen
ew either of removing some internal strangulation, or of

reducing an invagination. If there is good reason to believe that the former exists, it is decidedly permissible to risk opening the abdomen, especially if the case seems otherwise hopeless. As regards intus-susception, it is considered by most authorities only allowable to attemp its reduction when the large intestine is involved. Under any circumstances the results are not very satisfactory.

CHAPTER XLI.

INTESTINAL WORMS—HELMINTHIASIS.

IN the present article it is intended to give a brief account of the mai facts relating to those animal parasites which infest the alimentary cana of human beings; but it will be convenient in noticing their life-history to allude to another phase of their existence, as they are found in othe organs of the body. For a complete account of this subject the reade is referred to Dr. Cobbold's valuable work.

The ordinary intestinal worms include:—1. *Cestodes* or *tape-worm* *a.* Tænia medio-canellata. *b.* Tænia solium. *c.* Bothriocephalu latus. 2. *Nematodes.* *a.* Ascaris lumbricoides (round-worm). *b.* Ascaris or oxyuris vermicularis (thread-worm or seat-worm). *c.* Tricoc phalus dispar (hair-headed or whip-worm). Among rare varieties ar mentioned tænia nana or egyptica, elliptica, and flavo-punctata; bothrio cephalus cordatus; ascaris mystax; dochmius duodenalis; distom crassum and heterophyes.

ETIOLOGY AND DEVELOPMENT.—It seems tolerably certain that n intestinal worm ever develops in the bowel directly from an ovum deposited there by a previous tenant, but that this must be first discharge and undergo metamorphosis, being afterwards conveyed by some mean through the mouth into the alimentary canal in a certain stage of development, and when it reaches its peculiar habitat it grows into th adult animal. As regards the development of the nematodes, an embryo forms in each ovum after its discharge in the stools, or in the cas of the thread-worms, even while in the intestines; no further chang occurs while the ovum is outside, though it may retain its vitality for long period. In this condition it is supposed to enter the alimenta canal in various ways, such as in water, vegetables, fruit, or impu starchy substances. The ova of thread-worms may also probably carried to the mouth by the fingers of a person already infected, af scratching the anus. From some experiments, however, it would app that the embryos of round-worms will not undergo further change wl introduced into the stomach in the free state, and it has been sugges that they are taken up by some other animal, such as a small worm insect or its larva, which is swallowed along with vegetables and ot articles of diet.

The development of tape-worms is better known. Segments of th containing abundant ripe ova, separate and are discharged per anum, or even break up within the bowel; the ova escape and are scattered about in various ways; they are then swallowed by different animals, especially by pigs, oxen, and sheep, mixed with their food. In the alimentary canal the shell of the ovary ruptures, and then the embryo (*pro-scolex*) escapes, attaches itself to the mucous surface, and works its way into the tissues, until it reaches a suitable spot, where it settles down and undergoes further changes, presenting a head and neck with appendages like those of a tape-worm (*scolex*), from which a vesicular appendage or bladder hangs down. In this stage the worm is named a *cysticercus* or bladder-worm, such as is seen in the muscles, liver, brain, and other organs and tissues of different animals, sometimes in human beings. Each tape-worm has a special form of cysticercus; that of the tænia solium is named the *cysticercus cellulosus;* that of the tænia medio-canellata the *cysticercus medio-canellata.* This cysticercus may remain for some years, or finally perish; if, however, it in any way reaches the alimentary canal of the particular class of animal which it infests in the adult condition, it becomes attached by the head, the vesicle falls off, and then a succession of segments form, constituting the ordinary tape-worm. The usual way in which these larvæ reach the stomach is through eating the raw or imperfectly-cooked flesh of the animals which they infest; thus the tænia solium comes from pig's flesh (measly pork, &c.), tænia medio-canellata from beef; bothriocephalus is believed to be conveyed by fish or molluscs.

Different varieties of tape-worm are found in different parts of the world. In this country the tænia solium and medio-canellata are the forms met with, the latter quite as frequently as, if not more frequently than, the former. Bothriocephalus is prevalent in Eastern Europe as far as the Vistula, and in Switzerland, especially along sea-coasts and rivers. Tape-worm is by far most frequent in those countries where much pig's flesh is consumed, and individuals who do not eat this, such as Jews, are particularly exempt from the complaint. It is frequently observed among those who in their occupation are in the habit of putting knives used for cutting raw meat into their mouths, such as butchers, cooks, &c.; also among those who indulge in raw or very underdone meat, sausages and such articles, as then the parasites are not destroyed. It must be remembered that in this country beef is often the meat by which tape-worm is communicated. The bothriocephalus is supposed to be taken in drinking water. Women suffer more frequently than men, and usually the persons affected are between 16 and 40 years of age.

Round and thread-worms are principally found in children, especially if they are in bad health or improperly fed and dirty. Round worms are very prevalent in some parts of the world, viz., the Southern States of America, Greenland, Iceland, Brazil, and some parts of Holland, Germany, and France, especially in low and damp districts. They are common enough in this country. It is presumed that an unhealthy condition of the enteric mucous membrane, leading to the formation of much viscid mucus, favours the development of worms.

DESCRIPTION.—Only the main characters of the ordinary worms can be noticed here, so as to enable them to be recognised.

I. **Tape-worms.** In the adult form (strobila) ta
flattened, or tape-like in form, consisting of a head
quadrilateral segments or links (proglottides), vary
length of the worm, united by a softer and more tra
from behind the neck by budding, and then pass o
recently formed, so that the oldest are the most dist
are very small, but enlarge considerably as they be
time altering in form somewhat, and presenting a mo
worms are parenchymatous in structure, consisting
white contractile tissue; having no mouth or alin
water-vascular system communicating between th
sexual organs. These are not evident in the most r
appears first as a median tube with lateral branch
divided and developing ova, which almost complete
ing them opaque, and in these embryos may be visi
tortuous seminiferous tubes and a penis. Each seg
sexual orifice is either single or double, opening eith
the varieties of tape-worm inhabit the small intestine
the large bowel or the stomach. As a rule only a
ally two or more.

1. *Tænia Solium.*	2. *Tænia Medio- canellata.*
Length varies from a yard to 100 or 150 feet or more, but average is stated by different authorities at from 5 or 7 to 20 or 30 feet. Head very small, somewhat globular or bulbous, with a slightly prominent conical snout or rostellum in front, surrounded by a double row of curved silicious hooks, from 12 to 15 in each row; and further back 4 suckers, symmetrically arranged. Neck extremely slender, from ½ to nearly an inch long, transversely marked. Segments in their earliest stage very small and much broader than long; gradually become more flattened and altered in the relation of their diameters, so as to be first square and afterwards oblong, being much longer than broad, with the ends narrowed, especially the anterior. Mature links measure about ½ an inch long and ¼ inch broad. Male and female organs open by one orifice, which is situated laterally in a little projection, now on one side, now on the other, but not regularly alternating.	Has a general semblance to tæn solium, with the f lowing difference Length usual greater. Head la ger, has neith snout nor hook being flattened front, but its 4 suc ers are very pron ment and powerf Leuckart describe fifth smaller one b tween them. Lin more numerou broader, thicker, a firmer. Sexual gans more develop and divided, a orifice nearer t posterior border.

EMATODES. The main characters of these are indicated in the following

scaris Lumbricoides.	2. *Ascaris Vermicularis.*	3. *Tricocephalus dispar.*
longated and cylindrical, ing towards the ends, the anterior. Length 12 or 16 inches; and 2 to 3 lines. Appears reyish-red, or yellowish- ii-transparent, firm, and Head has three small es, with the mouth lined with numerous ircular depression sepa- n the body. The body ie transverse markings. listinct. Male shorter, posteriorly, where the ns are placed. Female and thicker at the emity; has the sexual out the end of the an- small intestines, but ates into the large out through the anus; the stomach, œsopha- , nares, frontal sinuses, bile and pancreatic l-bladder, peritoneum, ary organs, and various usually several; may ·; sometimes only one.	Very small and delicate, fusiform, males measuring from 1 to 2 lines long, females about 5 lines. Whitish and semi-transparent; surface presents fine transverse striæ. Head has a terminal mouth, with 3 scarcely evident lips, and a wing-like expansion on the dorsal and ventral aspects. Male is rolled up posteriorly, where the sexual organs are placed. Female is straight or but slightly bent, and has the vulva about the junction of the anterior and middle thirds. Habitat, the rectum and lower part of colon. Often migrate around the anus, into the vagina, urethra, or under the prepuce. Have been seen in the small intestines and stomach. Number usually very great; hundreds or thousands.	Thread-like in form, being from 1 to 1½ or 2 inches long. Posterior end thicker than anterior, which is hair-like, and ends in a simple terminal mouth. Male is the smaller, and is spirally coiled posteriorly. Female is larger and thicker, only slightly curved; the uterus contains an immense number of ova. Habitat, usually the cæcum, rarely the colon, very rarely the ileum. The head is generally imbedded in the mucous membrane, while the body moves freely. Number, usually not great, but may be hundreds.

OMS AND DIAGNOSIS.—Worms frequently exist in the alimen- without exciting any evident symptoms. When present these y indicative of local irritation; reflex disturbance; and more nstitutional disorder. Occasionally worms lead to congestion, ion, superficial erosions of the mucous surface, or even slight ; and in exceptional cases they may even cause obstruction vels, or by migrating into the stomach, bile-ducts, liver, larynx, n, and other parts, originate dangerous symptoms referable to s. It may be stated as a general rule that the symptoms are ked in delicate and weakly persons, or in those whose nervous highly susceptible; and that they are proportionate to the nd size of the worms.

cal symptoms attending the tape- and round-worms are un- curious sensations, or actual griping pain in the abdomen, about the umbilicus, sometimes amounting to attacks of ic, attended with vomiting or retching and faintness; capri- variable appetite, often with craving for special and indiges- es of food; furred tongue and foul breath; nausea or vomiting; of the bowels, constipation and slight diarrhœa alternating to time, the stools sometimes containing mucus; flatulence with distended abdomen. The main reflex phenomena described include itching at the various mucous orifices, causing especially scratching of the anus and picking at the nose; salivation; grinding of the teeth during sleep, which is uneasy and disturbed; dull frontal headache, with giddiness; noises in the ears; squinting, dilated pupils, œdema of eyelids, flashes and specks before the eyes; twitchings of the limbs or facial muscles, or violent convulsions ending fatally; choreic, hysterical, epileptic, or even maniacal attacks; deranged menstruation; palpitation; a feeling of constriction in the throat. Among the general symptoms observed are more or less wasting, pallor, sense of debility and languor, pains in the limbs, fretfulness and depression of spirits.

In a diagnostic point of view these symptoms are by no means characteristic of worms, and it is often a question how far they are due to these: still when they are present worms should always be thought of. The diagnosis may be verified by the passage per anum of fragments of a tape-worm or of entire round worms; and, if necessary, remedies may be given with the view of aiding their expulsion. Microscopical examination of the stools for ova is recommended in suspected cases. Portions of tape-worm sometimes escape spontaneously as the patient is walking along.

Thread-worms are very common in weakly and dirty children, and as they are often extremely numerous, they give rise to much local irritation, causing severe itching and tickling about the anus, which leads to constant scratching; this is especially intense towards night, and may gravely interfere with sleep. Occasionally these worms excite considerable dysenteric symptoms, and not uncommonly originate prolapsus ani. Also they frequently pass into the vagina, causing much irritation here, leading to catarrh, undue sexual excitement and masturbation, or now and then to severe hæmorrhage. By getting under the prepuce they also promote the habit of masturbation in males. On examination the worms may often be seen moving about the anus, as well as in abundance in the stools. Various reflex symptoms similar to those associated with other worms are said to be due to thread-worms, but this is doubtful.

The tricocephalus dispar does not give rise to any symptoms.

Prognosis.—Most worms may be readily got rid of if properly treated. Tape-worms are sometimes difficult to remove completely, but with systematic management a cure may almost always be effected. It is safest to see that the head of a tape-worm is discharged, else if this remains a further growth will probably take place; however, it is affirmed that if only the head and a small portion of the neck is left the worm will die; and further, the nearer the head any portion is which is detached, the more easily will the rest be got rid of. Worms may now and then prove highly dangerous by their migrations, or by causing obstruction of the bowels; death may also occur from reflex convulsions excited by them.

Treatment.—If worms are present in the intestines, of course the first object in treatment is to get them expelled. The remedies for this end must vary with the nature of the parasite. For tape-worm the following plan of treatment is usually efficacious:—To let the patient take

s, such as milk and beef-tea, for a day; then to administer a
f castor-oil in the evening; and finally, early on the following
if the oil has acted well, to give a draught containing the
act of male fern, in a dose of 10 drops to ʒi or ʒiss, according
he draught may be made up with sugar, mucilage, and milk;
yelk of an egg and cinnamon water. The object of this plan
out the bowels so as to expose the worm, and then the male
pon it and kills it. Sometimes it is desirable to follow this
her dose of castor-oil, but generally this is not needed, as the
acts as a purgative. Some authorities prefer giving the
smaller doses, frequently repeated; others employ the pow-
In order to see whether the head of the worm is discharged,
must be received into a separate vessel, then mixed with
iltered through coarse muslin.

nthelmintics employed for the destruction of tape-worms are
lowed by a cathartic; kamela powder (ʒi to ʒiij in treacle or
coction of the bark of the root of pomegranate (℥ij in Oj,
n to Oss); powdered areca nut; oil of turpentine (ʒi to ℥ss);
um (♏ xx to xxx). If the worm projects through the anus,
recommended to roll it gradually round a piece of stick, and
t out; or to apply some poisonous agent to the protruded

d worms the most efficient remedy is santonin, which is the
iple of the popular worm-seeds. It is well before administer-
re an aperient, such as a little jalap with scammony; and to
et to liquids for a day. Santonin may be employed alone,
ry morning for two or three days, in sugar or syrup or made
nges or with ginger-bread. It seems to be more efficacious
d with castor-oil, and Kückenmeister advises that from
dissolved in ℥i of the oil, and ʒi taken every hour until it
er preparations used containing santonin are an ethereal
vorm-seeds and santonate of soda. Mucuna and powdered
employed for the expulsion of round worms, which act by
irritation; some rely merely upon strong purgatives.

is also useful internally for thread-worms, but these are
est got rid of by means of injections, of which many kinds
employed. Any of the following will answer well, viz.:—
alt and other alkaline salts dissolved in water or gruel
; santonin with castor-oil; infusion of quassia; infusion or
f wormwood; tincture of steel (ʒi to Oj of water or infusion
; olive oil; lime-water; decoction of aloes; decoction of
n mere water, if employed freely for a few days. Cleanliness
importance.

ocephalus requires no special treatment.

ses of worms it is essential to look to the state of the general
improve this by means of steel and other tonics, with cod-
f required; as well as by regulation of diet and hygienic
The alimentary canal must also be attended to and the
t freely acting, so as to prevent accumulation of unhealthy
ammony, jalap, rhubarb, and castor-oil are the best aperients

In children important prophylactic measures a
maintenance of good health; the preservation (
in a satisfactory condition; and attention to clea

TRICHINOSIS.

It will be convenient to consider in the presen
to the entrance into the human body of a p
spiralis. It is very rarely met with in this cou
mon in some parts of the continent, where it o
epidemic.

ETIOLOGY AND PATHOLOGY.—Trichinæ are int
body solely by eating pig's flesh in which they e
imperfectly cooked condition, or in the form o
articles, sausages, etc. When this reaches the st
parasites are liberated and develope with grea
being far the more numerous and larger, and
number of young trichinæ, which perforate the
along the mesentery to the spine and then all c
the muscles, penetrating even the sarcolemma.
and here they set up inflammatory action, beco
capsule or shell. It is supposed that there are
young trichinæ in the alimentary canal, with subs

ANATOMICAL CHARACTERS.—In man trichina
enteric catarrh, often attended with enlargem
glands. After about the fifth or sixth week the
a lens to present fine striæ or minute dots, of a gr
aspect, which are collections of the parasite c
cysts produced by their irritation. These beco
the case advances, and are chiefly observed in t
diaphragm, intercostals, muscles of the neck, e
[illegible]

ous thrombosis, and parenchymatous degeneration of various organs frequently observed.

SYMPTOMS.—Trichinosis generally begins with symptoms of more or gastro-enteric disorder, such as pressure and fulness in the epigas-, impaired appetite, discomfort after eating, nausea or vomiting, tations, colicky pains, and diarrhœa, with a feeling of much languor depression; in some cases the onset is characterised by violent sick- and purging, simulating cholera or irritant poisoning. Occasionally disease sets in quite insidiously, with merely a feeling of lassitude depression, wandering pains, and stiffness in the limbs. The sub-ent characteristic symptoms are those dependent upon the condi- of the muscles. Those of the limbs which are affected become ful, tender, swollen, hard, and rigid; there is much stiffness, move- being greatly impaired, and the joints are fixed in a state of more ss flexion, any attempt to extend them causing much pain. From ication of various muscles result attacks of severe dyspnœa, aphonia, ns. dysphagia, impaired movement of the tongue, and other symp-. A peculiar œdema is also observed, affecting the face and eye- and extending in the limbs from the upper part towards the hands feet.

mptomatic pyrexia accompanies this condition, often severe, the erature sometimes rising to 106°, and the pulse to 120° or 140°; dant clammy perspirations may be observed, and occasionally ria. In cases tending towards a fatal issue, low typhoid symptoms , frequently with signs of bronchitis, pneumonia, and other inflam-ns. If recovery ensues, the muscular symptoms subside, as well e pyrexia, but convalescence is usually protracted, much debility, ia, and œdema remaining for a considerable time.

AGNOSIS.—Trichinosis may in severe cases be mistaken at first for ra or irritant poisoning. It may also simulate typhoid fever. After e the symptoms referable to the muscles are quite characteristic.

EATMENT.—To prevent trichinosis, meat containing the parasites be avoided, and microscopic examination of pig's flesh is prac- in some parts of the continent before it is allowed to be sold. In to be quite safe, the best plan is never to eat any pig's flesh which ot been thoroughly cooked. In the treatment of the disease, a of the first importance is to get rid of the trichinæ in the ali-ry canal by means of castor-oil or some other aperient, which may en even though there is diarrhœa. Benzine, carbolic acid, and emedies have been administered, with the view of destroying the es, but it is doubtful whether they succeed. The general treat- ust be supporting, with quinine and stimulants. Hot and ano- mentations or warm baths relieve the symptoms connected with scles most effectually.

CHAPTER XL

DISEASES OF THE LIVER AN

CLINICAL CHARACTERS.—1. Morbid sensations c
mainly to the right hypochondrium, but may ext
opposite side, or shoot in various directions. T
with or without tenderness; or merely a sense o
heaviness. Sympathetic pains in the right should
2. Some important symptoms result from distu
chief being those associated with jaundice, under
may be secreted in excess, or be of improper q
causing bilious diarrhœa and vomiting. Murchiso
conditions and ailments to disorder of the biliary s
3. Obstruction of the portal circulation leads
tributary veins. The obvious clinical phenomen
cating gastro-intestinal disturbance, with catarrh
into the alimentary canal; distension of the sup
enlargement of the spleen; and hæmorrhoids.
abdomen are often found much enlarged and vari
usual morbid changes which follow long-continued
4. If the liver is enlarged, it sometimes origi
neighbouring structures, such as the diaphragm, v
5. *Physical examination* of the liver may demo
tion in shape; enlargement; contraction; or alte
The general characters of hepatic enlargement a
sponds to that of the liver, or there is a history of
tion; it does not descend into the pelvis, but can
thorax, and appears superficial; sometimes it is
lower part of the chest. (ii.) Though the dimensi
the normal general outline of the liver can be t
the sensations on palpation are often sufficiently
somewhat movable on manipulation, but not to an
sion there is absolute dulness, with considerable
dulness can be traced upwards towards the chest
said to be characteristic of the liver; it is, howeve
distension of the stomach and bowels. (v.) The
often interfered with, especially on the right side;
position by deep breathing. (vi.) Posture may
more prominent and lower in the abdomen in the
6. Occasionally the gall-bladder presents an
characters:- (i.) It occupies generally the right
coming from under the margin of the liver, appea
however, it is so much enlarged as to extend
(ii.) As a rule the shape is pyriform, with the b
surface is generally smooth, and the enlarged o
feel. (iv.) Almost always the tumour is very mov
fixed point, which lies under the liver; even a cha
considerably. Now and then it is fixed by adhesio

CHAPTER XLIII.

FUNCTIONAL DISORDERS OF THE LIVER.

I. HEPATALGIA.

rrence of intermittent attacks of severe pain in connection liver has been attributed, especially by the late Dr. Anstie, to a euralgia in some instances. This affection is but a part of a nervous condition, attended with similar pains in other parts, p mental depression. The attacks are not accompanied with , but it is said that there may be jaundice. The main difficulty osis lies in separating this pain from that due to the passage of one.

II. JAUNDICE—ICTERUS.

ice is another of those symptoms which has been dignified by scribed as a special disease. Essentially it merely means the discoloration of skin and other structures which is observed e bile-pigments accumulate in the blood.

OGY AND PATHOLOGY.—Cases of jaundice have long been dito :—1. Those in which there is a mechanical obstruction to the f the bile through the ducts. 2. Those in which there is no truction.

ndice from Obstruction.—This may be due to :—(i.) Impaction foreign body in the hepatic or common bile-duct, viz., gall-hickened or gritty bile; mucus; rarely parasites, either formed in or its duct (distoma hepaticum* and hydatids), or having entered intestines (round worm); very rarely fruit-stones or other bodies ve passed into the duct from the bowels. (ii.) Catarrh of the membrane of the ducts, or of the duodenum about the orifice, narrowing of the calibre. (iii.) Organic changes in the walls ct or at the orifice, leading to more or less stricture, or even to obliteration, viz., congenital constriction or closure; thicken-e walls from inflammatory changes; perihepatitis; cicatrization cer either in the duct or duodenum. (iv.) Pressure upon the asion of its canal, or closure of its opening by tumours or especially by projecting growths from the liver; enlarged n the portal fissure; and pancreatic disease implicating the m; rarely by a pyloric tumour; growths in or behind the peri-hepatic aneurism; fœcal accumulation in the colon; uterine rian enlargements, including pregnancy; or a renal tumour or l kidney. (v.) Functional disturbance of the muscular coat uct, in the way of spasm or paralysis (?).

logists differ in their views as to how the bile is secreted, and ences the opinions as to the pathology of obstructive jaundice.

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distoma hepaticum or liver-fluke is a small trematode worm, often found in y rarely in the human being, occupying either the gall-bladder or bile-ducts. lattened, elongated, oval form; soft; and brownish or yellowish in colour.

It is generally maintained that both the bile-acids and pigm
formed in the liver; some believe, however, that the latter are g
either partly or entirely in the blood, and merely separated by t
Hence arise the two theories:—1. That the discoloration of jau
due to excessive absorption of the bile by the veins and lymphat
its formation. 2. That it results from suppression of its secreti
hence retention of the pigment in the blood. The former is p
the correct view, and the intensity of the jaundice will be in pro
to the rapidity with which the secretion of bile is going on, an
slowness of its decomposition in the blood. Absorption is alwa
ceeding during health, but the bile thus taken up is speedily cha
the process of nutrition.

2. *Jaundice without Obstruction.*—The conditions under whi
variety is supposed to occur are:—(i.) In certain specific fev
yellow, remittent, intermittent, and relapsing fevers; very r
typhus, typhoid, or scarlatina. (ii.) When certain poisons are
in the blood, especially in connection with pyæmia; snake-bites;
ing by phosphorus, mercury, copper, or antimony; inhalation of
form or ether. (iii.) In acute or chronic atrophy of the liver;
destruction of its tissue from any cause. (iv.) In congestion
liver. (v.) From disturbed innervation, especially after sudden
mental emotion. (vi.) When the blood is insufficiently aërat
pneumonia, new-born infants, or as the result of over-crowding
ventilation. (vii.) Where bile is formed in much excess. (viii.)
of habitual or long-continued constipation. (ix.) In certain
the portal system of veins, as when they contain abundant
granules, or are unusually empty after profuse hæmorrhage f
alimentary canal. (x.) As an epidemic.

Before mentioning the various explanations given of the oc
of jaundice under the above circumstances, I cannot but exp
agreement with those who consider that in many of these cases
from obstruction, at all events to some degree, which may a
pressure upon the smaller ducts within the liver; catarrh of t
ducts; or the formation of plugs of mucus. The views sug
different writers as to the pathology of the various forms of non
tive jaundice are that it is dependent upon:—1. Suppression
tion. 2. Increased absorption, so that more bile enters the bl
can undergo decomposition, either from excessive secretion
retention of bile in the intestines owing to constipation; or d
of pressure in the portal vessels. 3. Impaired and delayed
phosis of the bile-elements in the blood, and some think that
acids are converted in this fluid into bile-pigments, owing to
oxidation. 4. Conversion of the hæmatine of the blood
pigments. With regard to the influence of nervous distur
producing jaundice, it is presumed that this may affect the a
the secretion; the state of the portal veins; or the rapidi
changes in the blood.

Jaundice is by no means a necessary accompaniment of e
organic disease of the liver itself, and, in such cases, when i
marked it generally results from some projection from this or
fering with the main ducts; or from the glands in the port

ing involved. It may be due to destruction of the hepatic tissue; or the ducts or the circulation in the interior of the liver being inter- ed with.

ANATOMICAL CHARACTERS.—In jaundice not only are the skin and junctivæ more or less stained with bile-pigment, but also most of the es, organs, and fluids of the body, as well as morbid exudations d effusions. In the skin the pigment accumulates chiefly in the rete cosum, also involving the sweat-glands considerably. The nerve- es are but slightly affected, and the mucous membranes generally, h their secretion, still less. The bile-pigments are found in the clot d serum of the blood, but not the acids; in prolonged cases coagula- is imperfect, and the corpuscles are altered in their characters; le not uncommonly extravasations of blood are evident. In cases of tructive jaundice the liver itself becomes at first enlarged uniformly, out any alteration in shape, and mottled of a more or less deep ow tint, in some cases being olive-green; its ducts are distended, in time numerous particles of pigment are seen in the cells. Should obstruction implicate the common duct, the gall-bladder will be en- ged. If the obstruction is persistent, the liver undergoes degeneration, coming atrophied, very dark, sometimes almost black, and softened, y of its cells being destroyed, leaving only a granular detritus under microscope. The kidneys also are much changed in prolonged es, being deeply coloured, their tubules containing a black or brown posit, and their secreting cells presenting granules of pigment, or mately breaking down.

SYMPTOMS.—The most obvious clinical phenomena associated with ndice are those derived from the external discoloration; the characters the urine; and the consequences of absence of bile from the alimen- y canal. Usually the signs are first afforded by the urine; next by e conjunctivæ; and lastly by the skin. The conjunctivæ are more or deeply tinged yellow. The skin may present a variety of tints, a faint yellow to a brownish- or blackish-green. The colour is epest where the epidermis is thin, and varies with age, complexion, ount of fat, &c. If the lips or gums are pressed, so as to expel the od, a yellowish hue is often observed. The urine exhibits a colour ing from a light saffron-yellow to one resembling mahogany or er; on standing it usually becomes greenish. Its froth is yellow, d it will tinge white linen or blotting-paper dipped into it, often stain- the under-clothing. Chemical examination is most important, as cating the presence of bile-pigments; and, as many believe, of bile- ds. The former are tested for by nitric acid. Either a few drops of ne and acid may be placed on a white porcelain surface, and allowed come into contact; or a little urine may be poured into a test-glass, d the acid allowed gently to run down its interior, so as to sink to the ttom. A play of colours is observed, to violet, green, blue, and red, ese soon disappearing. The bile-acids are detected by Pettenkofer's st, viz., by adding a fragment of lump sugar to a little urine in a test- ss, and then pouring in a small quantity of strong sulphuric acid, op by drop, allowing it to trickle down the side of the tube. A deep rple colour is produced where the acid and urine meet. Dr. George arley and others affirm that the bile-acids are only present in the urine in cases of *obstructive* jaundice, and not in that due to *suppression*; also that they may disappear in prolonged cases of the former, owing to destruction of the liver tissue. Another important character is, that the urine often contains leucine and tyrosine, crystals of which may be seen under the microscope after careful evaporation of some of the excretion to a syrupy consistence. In some cases the quantity of urine is deficient at first; the reaction is acid; the proportion of urea and uric acid varies, and they may be in excess. In advanced cases sugar sometimes appears. Renal epithelium or casts tinged with biliary colouring matters are occasionally observed.

When the bile does not reach the intestines, the consequences are constipation with unhealthy stools, these being deficient in colouring matters, often pale-drab or clay-coloured, dry, offensive, and containing excess of fat; and the formation of much foul gas from decomposition, with consequent flatulence and passage of fœtid flatus. Occasionally diarrhœa is observed from time to time; or dysenteric symptoms set in. There is usually a disinclination for food, especially for fatty matters, and eructations are common, which may have a bitter taste. Evidence of the presence of bile is often afforded by the sweat, milk, saliva, and tears. From the accumulation of bile-acids in the blood result not uncommonly cutaneous itching, which may be very distressing; slowness of the heart's action and pulse, which may fall to 50, 40, or even 20 per minute; and a feeling of languor, depression, debility, lowness of spirits, incapacity for exertion, irritability, and drowsiness. The symptoms last-mentioned are also partly due to the emaciation and impaired nutrition which usually become soon apparent, in prolonged cases being very marked. In some instances urticaria, lichen, boils, carbuncles, or petechiæ are observed. Yellow vision (xanthopsy) is an extremely rare phenomenon, and its cause is very uncertain.

Jaundice, especially the non-obstructive variety, may be accompanied with typhoid symptoms; low nervous phenomena; or dangerous hæmorrhages, particularly from the stomach and bowels, ending speedily in death. It is important to observe that these phenomena are often quite out of proportion to the intensity of the jaundice. They have been attributed to the accumulation in the blood of bile-acids, of cholesterine, of products resulting from the decomposition of bile-acids or their formative elements, or of some noxious substance formed in the cells of the liver; or to the metamorphosis of materials in the process of preparation for excretion by the urine being checked or modified, owing to a deficiency of bile, which is required for these changes, so that, instead of urea and such compounds, intermediate products are formed, which collect in the blood and act as poisons. Might it not be that, in some of these cases at all events, the above symptoms are independent of the jaundice, and result from some general morbid state, or some condition of the kidneys which leads to blood-poisoning?

Physical examination will probably in cases of obstructive jaundice reveal in a short time enlargement of the liver, not great, and quite regular. If the common duct is obstructed, the gall-bladder may also present a fluctuating enlargement. In prolonged cases the liver ma ultimately afford the physical signs of atrophy.

The course, duration, and intensity of jaundice vary greatly accordin to its cause. It may be merely a slight temporary disturbance; or permanent and extreme in degree.

DIAGNOSIS.—The first matter in diagnosis is to be certain that there is jaundice. The discoloration of the skin might possibly be simulated by a chlorotic tint; the cachexia of chronic lead-poisoning, malaria, or cancer; the colour associated with supra-renal disease; or bronzing from exposure to the sun. The conjunctivæ and urine should always be particularly examined. It must be remembered, however, that the yellowness due to the collection of fat under the conjunctiva may be mistaken for that of jaundice. Also pigments sometimes form in the urine, which render it very dark; and now and then malingerers purposely stain the skin and add colouring matters to the urine.

It may be difficult to determine whether jaundice is of the obstructive or non-obstructive variety, but the latter, as well as its particular cause, may be generally recognised:—1. By the circumstances under which it occurs, and the other symptoms which accompany it. 2. By the discoloration being less marked. 3. By the presence of more or less bile in the stools. 4. By examination of the urine, which, according to Dr. G. Harley, gives indications of the presence of bile-acids only in the obstructive form of jaundice, though many deny this; and which in the non-obstructive variety yields leucine and tyrosine.

The precise cause of obstructive jaundice is determined by:—1. The age, sex, habits, and general past history of the patient. 2. The preceding and accompanying symptoms, both local and general. 3. The rapidity with which the jaundice has set in and its intensity. 4. Careful physical examination of the abdomen. 5. The course and progress of the case and the effects of treatment. Intelligent attention to these points will generally lead to a correct opinion. The more rare causes can only be made out by exclusion, and are often merely guessed at. The fact of the gall-bladder being enlarged or not will as a rule show whether any obstruction involves the hepatic or common bile-duct.

PROGNOSIS.—In most cases the prognosis of jaundice depends rather on the morbid condition with which it is associated, than on this particular symptom. As a rule, therefore, it may be stated that non-obstructive jaundice is much the more grave. Typhoid and low nervous symptoms are highly dangerous; as are also hæmorrhages and signs of interference with the renal secretion. In obstructive cases not only will the prognosis vary with the cause of the jaundice, but also with the rapidity with which it comes on, its intensity, and mode of progress. In every case a cautious prognosis should be given, as it is never certain how it may turn out, and this is particularly true if jaundice sets in rapidly and becomes speedily intense. Catarrhal jaundice generally soon disappears. Of course when it is due to obstructive organic disease, especially cancer, there is but little hope of its removal; but it is astonishing to what an extreme degree the discoloration may attain in some instances, without any proportionate general disturbance to lead to the idea that bile acts as a poison. Jaundice in pregnancy is considered highly dangerous.

TREATMENT.—In general terms the management of cases of jaundice may be summed up thus:—1. To treat the condition upon which it depends, and remove any obstruction to the flow of bile, if practicable.

2. To promote secretion of bile, if necessary, by remedies to be hereafter considered; or on the other hand to limit its formation. 3. To attend carefully to the diet, especially avoiding fatty and oily substances, as well as much starch, sugar, or alcoholic stimulants. 4. To treat the symptoms due to the absence of bile from the alimentary canal, especially constipation and flatulence; or to supply a substitute for thi secretion in the way of artificially-prepared inspissated ox-gall, gr. v—x given two to three hours after meals. 5. To promote the renal an cutaneous excretions. 6. To attend to the general condition, givin quinine, iron, and other tonics, as well as adopting hygienic measure for improving the health in chronic cases; treating adynamic symptom by stimulants; low nervous symptoms by encouraging free eliminatio by the bowels, kidneys, and skin; hæmorrhages by astringents. I cases of permanent obstruction, it has been proposed to make an artificial fistula into the gall-bladder, having first excited adhesion with th abdominal wall by means of escharotics. The irritation of the ski may demand measures for its relief; alkalies with opiates or morphi internally, or the latter hypodermically, and warm and alkaline bath are most serviceable for this purpose. It must not be forgotten tha the colour of jaundice remains for a time after any cause of obstruction has been removed; and if this has been effected it is not necessar to continue further active measures. The removal of the bile from th system may be promoted by occasional alkaline baths, aperients Cheltenham and other mineral waters; while convalescence is hastene by hygienic and other measures for improving the general health.

CHAPTER XLIV.

CONGESTION OF THE LIVER—HYPERÆMIA.

ETIOLOGY.—Active hepatic congestion occurs to some degree duri every period of digestion. As a morbid condition it is met with: 1. After errors in diet, particularly in those who take but little exerci especially habitual excess in eating, or indulgence in too rich articl abuse of alcohol or hot condiments. 2. As the result of continued posure to excessive heat in tropical climates; or of a sudden chill w heated. 3. In connection with malarial, yellow, relapsing, and o fevers. 4. Vicarious of menstruation; or, it is said, of habitual charges, *e.g.*, bleeding from piles. 5. As the result of injury. 6. A ciated with morbid deposits in the liver, and the early stage of infl mation.

Mechanical congestion is generally due to some condition of heart or lungs which interferes with the general venous circulati very rarely to local obstruction of the hepatic vein or inferior cava.

Passive congestion is said to follow habitual constipation; or to re

rpid state of the portal system, due to paralysis of the coats of
ls or any other cause.

MICAL CHARACTERS.—It is only the mechanical form of con-
at is generally seen after death. The liver is enlarged more
quite uniformly, its surface being smooth, and the capsule
. It often feels unusually firm. On section an excessive
of blood flows; the colour of the surface is dark, sometimes
le; and the vessels appear abnormally filled, becoming in time
tly dilated. The dark colour is rarely uniform, but is evident
connection with the intralobular branches of the hepatic veins,
ng the so-called *hepatic congestion*. *Portal congestion* is the term
hen the vessels at the circumference of and between the
re most distended, but this is rarely seen. The ultimate
long-continued mechanical congestion will be described in a
t chapter, but allusion may be made here to what is termed
meg liver." This morbid condition is thus named from a
the organ presenting a variegated appearance, resembling that
eg, there being a mixture of red, white, and yellow tints. It
ed after congestion from cardiac obstruction has lasted for
e, and depends essentially on the following pathological
The branches of the hepatic vein are distended and over-
eep red, and well-defined; the circumference of the lobules
ding to the portal branches is anæmic, and has undergone
ive fatty changes, hence being pale and opaque; while the bile
t in many of the smaller bile-ducts, which accounts for the
t.

MS.—Locally hepatic congestion tends to produce a sense of
table tension, fulness, and weight, especially after meals and
ng on the left side; sometimes there is slight tenderness.
y be pain in the right shoulder. Slight jaundice is often
ut the stools contain bile. The spleen becomes enlarged in
time in cases of mechanical congestion. Commonly the
y canal is deranged, as evidenced by impaired appetite, foul
onstipation or diarrhœa, and flatulence; but this is often the
he same cause which originates the hepatic congestion, though
partly due to deficiency or unhealthy quality of the bile.
neral disturbance often accompanies the congestion. The
frequently deficient and concentrated, depositing abundant
also commonly contains biliary colouring matter.

hysical signs of congested liver are moderate enlargement,
some variation; regularity and uniformity in shape, as well
rface and margins; with frequently somewhat increased firm-

MENT.—For active congestion the measures to be adopted are
e its exciting cause, an emetic being useful if it is due to irri-
icles of food; to restrict the diet to small quantities of beef-tea,
d such articles; to apply warm poultices, fomentations, or
over the hepatic region; or to dry-cup freely, or in some
n to remove a little blood by leeching or cupping, or by apply-
leeches around the anus; and to give a dose of calomel or
followed by saline aperients, such as citrate of magnesia,

sulphate with carbonate of magnesia, sulp
tartar. After the acute symptoms have s
are useful, as well as alkaline and saline m
the principles of treatment must be similar
in connection with chronic hepatic diseases
cases of mechanical congestion.

CHAPTER XLV.

ACUTE INFLAMMATORY DISEAS

I. CIRCUMSCRIBED OR SUPPURATIVE INFLAM

ETIOLOGY AND PATHOLOGY.—The usual
of the liver-tissue is that which ends in su
rare, except in tropical climates. The ca
principally among sailors and others who ha
Murchison distinguishes two forms of hepa
pyæmic, the latter occurring in temperate cli

The general causes of acute hepatic infl
follows:—1. Occasionally direct injury to t
region. 2. Convection of septic matters fro
either internal or external, the products of w
ulcerations, or gangrene. The deleterious
any part, but hepatic abscess is especially
gangrene of the stomach or bowels; as the
the alimentary canal; and in connection wit
inflammation about the bile-ducts or gall-
materials are immediately taken up by th
Some are of opinion that in these cases th
bitis, extending along the portal vessels to
the softening and breaking-down of an en
portal vein (*suppurative pyle-phlebitis*), the p
the liver and originating an abscess ther
irritation in the substance of the liver, *e.g.,*
gall-stones: round-worms which have ente
foreign bodies. 5. The etiology of *tropic*
comment. It has been regarded by Budd
essentially pyæmic, resulting from previou
stances it is highly probable that this is th
means in all, for there is often no sign wha
are two views as to the *exciting causes* of
cases:—*a.* That it is the direct consequence
combined with malarial influence. *b.* Tha
ences, which induce a *predisposing* deprave
there must be a sudden chill acting upon
excessive eating, and indolent and luxurio
powerful predisposing causes.

ꞏAL **CHARACTERS.**—The post-mortem examination in acute
ıerally reveals suppuration. It is supposed to commence
yperæmia; followed by effusion of lymph and degeneration
ic cells, causing the affected part to become swollen or
aler, yellowish, and softened; then suppuration begins in
: centre of the lobules, which gradually coalesce, forming
various sizes. The pus-cells are probably partly leucocytes;
ducts of endogenous multiplication of the liver-cells. The
nber, size, and exact shape of the abscesses vary widely;
: nature and amount of their contents; and the condition
ınding tissue. The right lobe is much more frequently
the left. Important differences as to number and size are
observed between tropical and pyæmic abscesses. In the
here is generally one large abscess, and rarely is the number
in the latter the separate accumulations of pus are very
d small, not often being above a hen's egg in size. My
experience of hepatic abscess would lead me to the con-
:here are at least exceptions to this rule.

hepatic abscesses are more or less rounded, but by coales-
xtension they often become very irregular. The contents
:mble healthy pus at first, but in time they may become
or altered by admixture of bile, or more or less fœtid and
At first the walls consist of liver-tissue, usually con-
ltrated, softened, and ragged; in time the boundary may
erted into a smooth firm capsule.

:ss and termination of these abscesses are variable also.
and especially when of the tropical variety, they tend
surface of the liver, finally bursting externally; into
um, intestines, stomach, gall-bladder, hepatic duct, he-
:al vein, inferior vena cava, or pelvis of right kidney; or
; through the diaphragm into the pleura, lung, or pericar-
the discharge of the pus, cicatrization may take place,
raction and depression of the surface of the liver. In
ın abscess remains dormant for a considerable period, and
:xtends. It is believed also that the fluid portion of the
absorbed, the contents becoming caseous, then putty-like,
.lcareous, the tissue around forming a dense cicatrix.

adder is sometimes inflamed. The bile contained in it is
healthy, but presents no special characters. The conse-
he rupture of an abscess into various structures are de-
ıer parts of this work.

—As a rule the symptoms of hepatic inflammation are
nt. They are *local* and *general*.

in and tenderness are generally complained of over some
epatic region, often preceded by mere uneasiness. The
nuch in its severity and characters; in most cases it is at
hing, and tense, but usually increases when suppuration
nay then become throbbing; it is more marked when the
is near the surface. Sympathetic pains about the right
scapula are occasionally present, but, it is stated, only
ıer surface of the right lobe is affected. Then also a deep

breath or cough aggravates the pain; and the breathing is hurried, short, chiefly upper costal, while there is some sense of dyspnœa, with often a short dry cough. Jaundice is very uncommon in connection with tropical abscess, but some degree of it is frequently observed in pyæmic cases. Ascites is extremely rare, unless the inflammation depends on pyle-phlebitis, when signs of great obstruction of the portal vein are prominent, and this is important in diagnosis. More or less disturbance of the alimentary canal is almost always observed, such as loss of appetite, furred and irritable tongue, thirst, nausea or vomiting, constipation or diarrhœa. The urine is at first very markedly febrile; after suppuration it often becomes pale, copious, and deficient in urea.

Physical characters.—The liver is at first uniformly and moderately enlarged. Should the abscesses formed be small and deeply seated, nothing further can be observed; but if one or more of them become large and superficial, then the following characters are presented:—1. The general enlargement increases considerably, and in addition a bulging prominence presents in some direction, or occasionally more than one. This is generally observed in the epigastrium or right hypochondrium; sometimes it causes distension of the lower part of the chest, with flattening of the spaces. 2. The general surface and margins of the liver usually feel smooth and regular, but occasionally, from the projection of several small abscesses, or on account of peri-hepatitis, they are undulated and irregular. 3. The local bulging soon affords a sensation of elasticity and then of fluctuation, gradually extending and becoming more perceptible, surrounded often by a ring of inflammatory induration. No hydatid-fremitus can be felt. 4. The hepatic dulness is altered in outline as well as in area, and when the abscess tends towards the thorax, this is often one of the chief signs noticed. 5. Auscultation may reveal friction-sound over an abscess, due to perihepatitis. It may also indicate invasion of the chest, and interference with the expansion of the right lung. 6. By means of the aspirateur pus may be obtained, and this is important for diagnosis in doubtful cases. I may mention that marked pulsation may be observed in connection with an abscess presenting in the epigastrium, conducted from the aorta, simulating aneurism. The spleen may be enlarged, but chiefly in pyæmic cases, and not as the direct result of the hepatic disease.

General.—Chills or rigors often usher in an attack of acute hepatitis, followed by more or less pyrexia, with considerable constitutional disturbance. Suppuration is usually indicated by repeated rigors; fever of a hectic type, not uncommonly remittent or intermittent, with abundant sweats; and much prostration and wasting. Ultimately typhoid symptoms are very liable to arise, ending in low nervous disturbance and death. The constitutional symptoms are as a rule more severe in pyæmic than tropical cases.

COURSE AND TERMINATIONS.—The ultimate course of events will depend upon the progress of the disease. The symptoms may subside, and the abscess undergo retrograde changes, ending in a cure. Almost always, however, it tends to open in some of the directions already mentioned, and the corresponding symptoms may be readily gathered from a little consideration. When it approaches the surface, the abscess causes redness, œdema, and the other signs of superficial suppuration.

re it bursts. Most cases of hepatic abcess are fatal and rapid in progress, but tropical cases may last six months or more; pyæmic s are much the more fatal and speedy in their termination. Some s go on for a long period and ultimately recover, the abscess dis- ging its contents and cicatrizing.

II. Peri-hepatitis.

his term is applied to inflammation of the covering of the liver and son's capsule, which is not uncommon as an acute affection, asso- d with peritonitis, or organic diseases of the liver; or resulting from y or extension of inflammation from neighbouring parts. It is also to arise from a chill. It leads to exudation, with thickening, opacity, adhesions; occasionally pus is formed. The symptoms are pain the liver, sometimes sharp, increased by cough and deep breathing, superficial tenderness, but no particular derangement of the hepatic tions, or alterations in the physical characters of the organ. There sually more or less pyrexia. If the affection is chronic; or if re- ed attacks arise, as not uncommonly happens in syphilis or chronic t diseases, there may be signs of obstruction of the portal vein or duct, with atrophy of the liver.

III. Inflammation of the Bile-ducts.

atarrh of the bile-ducts is by no means an uncommon affection, g especially met with in children and old gouty persons. Its chief es are extension of catarrh from the duodenum; hepatic conges- ; irritation of the mucous membrane by gall-stones, parasites, ign bodies, and perhaps unhealthy bile, which may cause consider- inflammation; and blood-poisoning in fevers and other affections. morbid appearances are similar to those of other catarrhs. Occa- ally croupous or diphtheritic inflammation is observed. The symp- s of simple catarrh merely indicate partial obstruction of the bile- ts, with consequent jaundice and enlargement of the liver and gall- lder, generally preceded by signs of gastro-duodenal catarrh. There ften local pain and tenderness, with some pyrexia. The duration course of these cases vary, but generally they soon recover.

General Diagnosis, Prognosis, and Treatment.

IAGNOSIS.—The occurrence of acute local symptoms connected the liver, with constitutional disturbance, should lead to the sus- on of inflammation, especially in tropical climates, or if there is any ious cause of pyæmia. At first there may be considerable difficulty istinguishing inflammation from mere active congestion; and also separating the different kinds of inflammation from each other, cially suppurative hepatitis and peri-hepatitis. When pus forms, is generally revealed by evident physical signs, and increased stitutional disturbance. Commonly, however, distinct objective in- tions of pyæmic abscesses are wanting. The differences between e and tropical abscess have been already alluded to. The chief ditions which may be mistaken for abscess in the liver are inflammation and suppuration of the gall-bladder; a suppurating hydatid cyst; and abscess in the abdominal parietes. Local peritonitis may simulate hepatitis.

Prognosis.—In the milder forms of hepatic inflammation the prognosis is generally favourable, but when suppuration occurs it is very serious. It will then depend mainly on the size and probable number of the abscesses; the direction in which they open, Maclean stating as his experience that the largest number of recoveries follows bursting into the lung, and then into the intestine, and that the prognosis is much more favourable when the abscess points at the ensiform cartilage than in an intercostal space; the general condition of the patient; and whether the liver-affection is associated with other morbid states, such as dysentery. Pyæmic abscesses are very fatal.

Treatment.—The slighter forms of hepatitis may be treated in the same manner as active congestion. Much difference of opinion is held as to the management of tropical abscess in its early stage. The usual measures recommended are venesection, or local bleeding by leeches or cupping; constant poulticing or fomentations; saline purgatives internally; and the administration of calomel. Dr. Maclean, who strongly opposes bleeding and mercury, advocates the free employment of ipecacuanha, as in dysentery. Tartar emetic and tincture of aconite have also been used. With regard to pyæmic abscess, there can be no question but that the severe lowering measures mentioned above are most injurious. When suppuration occurs, poultices and fomentations must be assiduously applied. The question of opening abscesses is one which is also much discussed. Most authorities seem to be in favour of operating; some prefer leaving the abscess to take its own course, on account of the dangers of peritonitis, decomposition from entrance of air, hæmorrhage, or gangrene. If there is satisfactory evidence of the existence of a single abscess, it appears to me certainly advisable to let the matter out, and even in doubtful cases the aspirateur may be advantageously employed. When there are several collections of pus, as in pyæmia, operative interference is contra-indicated. The different modes of evacuation advocated are by the aspirateur or a small trochar and canula; free incision; or application of caustic potash so as to produce a slough, this last being also used to excite adhesions to the abdominal wall. The air should be as carefully excluded as possible, and carbolic acid freely used. In the case of a moderate-sized abscess, it seems best to let out all the pus at once, and leave a canula or drainage-tube in; when very large, it may be emptied gradually by successive operations. Large poultices should be afterwards applied, being very frequently changed, and disinfectants freely used, the patient lying as much as possible in that position most favourable for the escape of the pus. It is useful in some cases to wash out the abscess with weak carbolic acid. In the early period of the disease the diet should consist of milk, beef-tea, and such articles; when suppuration is set up it should be as nourishing as possible, while stimulants are called for at this time, as well as quinine, mineral acids, or tincture of steel. Narcotics are often required, and various symptoms demand attention in many cases. The general treatment for pyæmia is indicated in pyæmic cases.

CHAPTER XLVI.

ACUTE YELLOW ATROPHY.

LOGY AND PATHOLOGY.—The causation of this rare hepatic disease y uncertain. Most cases occur in connection with pregnancy, but it o been attributed to severe nervous disturbance from depressing ons; blood-poisoning in typhus, scarlatina, and other fevers; al influence; or to the production within the body of some special n, the product of faulty digestion or assimilation. The chief *pre-ing causes* mentioned are age, the disease almost always being ved before 40, but never in childhood; the female sex; intem-ce; venereal excesses; and syphilis.

regards its pathology, most authorities consider acute atrophy as the consequence of diffuse parenchymatous inflammation of the excited by some poison. It has also been attributed to obstruc-f the smaller bile ducts; or to excessive formation of bile in them, eby pressure is exercised on the surrounding structures.

ATOMICAL CHARACTERS.—The obvious characters are marked dimi-n in size and weight of the liver; relaxation of tissue and soften-change in colour to a dull yellow; and disappearance of all s of lobular divisions. The organ may be reduced to half its ary bulk or even less, being especially diminished in thickness, it lies out of sight at the back of the abdomen, shrunken and flaccid, e the peritoneum covering it is lax and often in folds. In parts e the disease is less advanced hyperæmia and a greyish exudation been described. Microscopic examination reveals fatty degenera-and destruction of the gland-cells, until nothing remains but a ular detritus, oil-globules, and pigment. There is only a little s in the gall-bladder and ducts as a rule. Extravasations of blood e alimentary canal and other parts, with ecchymoses, are not un-mon. The spleen is generally enlarged. The kidneys exhibit eration of, and deposits of pigment in, the epithelium cells. cine and tyrosine are found in the blood, as well as in the tissues of liver, spleen, and kidneys.

MPTOMS.—There may or may not be premonitory symptoms of o-enteric catarrh, or general uneasiness and painful sensations, but e is nothing characteristic about these. Slight jaundice is usually observed, and it afterwards increases, but seldom becomes intense, it may be limited to the upper part of the body. It has been attri-ed to blocking-up of the smaller ducts by the débris of the cells. ong the ordinary symptoms are pain and tenderness over the epigas-m and hypochondrium, vomiting, and constipation. There is not h pyrexia, but the pulse is often hurried and is liable to much ation, while the temperature is considerably raised in some cases rds the close.

he striking clinical phenomena in this disease, however, are those ificant of the "typhoid state," with prominent nervous symptoms; t diminution or complete disappearance of the hepatic dulness;

generally enlargement of the spleen; peculiar changes in the urine; hæmorrhages. The nervous symptoms consist at first of headache, depression, languor, irritability, and restlessness; speedily followe low delirium, stupor, coma, twitchings, convulsions, with involu discharge of fæces and urine. At the same time the tongue bec brown and dry, with sordes on the teeth. The urine yields con able quantities of leucine and tyrosine, while the urea, uric acid salts are much diminished, being sometimes almost entirely absent; bile-pigment is usually present, and often a little albumen or Hæmorrhage most frequently takes place into the stomach and bo cutaneous petechiæ and vibices are not uncommon, and in rare inst uterine hæmorrhage or epistaxis occurs. The course of the dise generally very rapid, and the termination fatal. When it arises course of pregnancy, it leads to miscarriage or abortion.

Diagnosis.—At first it is difficult to diagnose acute atrophy liver, but once the symptoms are fully developed, with the ph signs of diminution in the size of the organ, the nature of the d becomes evident.

Prognosis is very grave, the disease almost always ending fatall

Treatment.—Free purgation; promotion of the action of the sk hot air or vapour baths; diuretics; blistering and leeching the and cold douches have been the chief measures recommended they are of little service when the disease is established. Hæmorr and other symptoms must be treated as they arise.

Chapter XLVII.

CHRONIC DISEASES OF THE LIVER.

I. Hypertrophy and Atrophy.

A simple hypertrophy of the hepatic tissue is said to be observe some cases of leucocythæmia; very rarely in diabetes; and as the of prolonged residence in hot climates. Clinically it is indicate a slow, moderate, and uniform enlargement of the liver; without evident symptoms.

On the other hand, atrophy generally occurs in old age; or result from starvation; or from pressure upon the surface of the by tight stays, peritoneal adhesions, and other conditions.

II. Fatty Liver—Hepar Adiposum.

Etiology.—This affection belongs to the fatty infiltration secreting cells becoming filled with oil. The conditions under w is usually met with are:—1. In phthisis and other wasting dis such as cancer, gastric ulcer, chronic dysentery. 2. In chronic rt affections, leading to imperfect aëration of blood. 3. As the f over-feeding, especially excessive consumption of hydro-carbo- substances; and abuse of alcohol, particularly in the form of spirits. Deficient exercise and indolent habits aid greatly in velopment of the disease under these circumstances. Some als are much more predisposed than others. Fatty degene- ay be set up in connection with other morbid conditions of the albuminoid infiltration or cirrhosis.

TOMICAL CHARACTERS.—In well-marked fatty liver the morbid ers include enlargement and increase in weight, though the gravity is diminished, the margins being thickened and rounded, e surface quite smooth; a more or less yellow colour, with , both externally and on section, generally mottled with red; g of the tissue, which has a doughy, inelastic feel, pits on pres- nd readily breaks down or tears; anæmia, but little blood g from the cut surface; loss of distinctness of outline of the ; and evidence of the presence of much fat to the knife, blotting- or ether. The liver may yield as much as 43 or 45 per cent. of atters, which consist of olein and margarin, with traces of choles- Microscopic examination shows enlargement of the cells, which e spherical, and more or less loaded with fat. In the less ed cases the change is only thus revealed. It is found that the d process extends from the circumference of the lobules towards entre.

PTOMS.—As a rule there are no evident symptoms connected with er. Dyspeptic disturbances are common. *Physical examination* only positive means of diagnosing fatty liver:—1. There is enlarge- in a downward direction, slow in its progress, and usually moderate gree, the organ never attaining any great size. 2. The shape is normal, and the surface and margins are smooth and regular, the feeling rounded. 3. Palpation often reveals a soft, doughy con- ce of the tissue. The general symptoms are frequently those asso- l with fatty changes, viz., want of tone; inaptitude for exertion; and pastiness of the skin. Signs of fatty changes in other organs issues, as the heart, vessels, and kidneys, may be observed.

III. ALBUMINOID, LARDACEOUS, OR WAXY LIVER.

e *ætiology* and *pathology* of this morbid condition have already been dered. The liver is one of the most common seats of albuminoid sit.

ATOMICAL CHARACTERS.—Commonly the size and weight of the are considerably increased, as well as the specific gravity. Shape arcely altered, but the liver is somewhat flattened, with rounded s. The surface and margins are quite smooth, the peritoneum is ched, and the tissue feels very firm and resistant. On section the l pale, anæmic, dry, greyish, and glistening aspect of lardaceous ase is observed; often the surface is quite homogeneous, without any e of lobules, or these may appear enlarged. The ordinary chemical s are yielded, and microscopic examination reveals the presence of deposit in connection with the vessels and cells. It is first observed in the middle zone of the lobules, where the branches of the artery are distributed. The exact appearance may be varied association of other morbid conditions, such as fatty dege cirrhosis, or syphilitic cicatrices. The disease commonly invol organs at the same time.

SYMPTOMS.—As a rule hepatic symptoms are not prominent sensations rarely amount to more than a feeling of weight, ten discomfort. Jaundice and signs of obstruction of the circul also very uncommon, and when present are due either to pr enlarged glands in the portal fissure, or by thickenings in c with local inflammatory changes; or ascites may result from peritonitis or constitutional debility and anæmia. The *phys* are :—1. Enlargement, chiefly in a downward direction, grad progress, frequently very great at last, so that the liver presents prominent tumour. 2. No perceptible alteration in form, th being smooth and uniform, with rounding of the margin. sistence dense and resistant, often extremely hard. There are general symptoms indicative of albuminoid disease; with in m signs of implication of other organs; as well as of the existence constitutional condition with which it is associated.

IV. HYDATID TUMOUR OF THE LIVER—ECHINOCOCCUS HO ACEPHALOCYST.

ETIOLOGY AND PATHOLOGY.—The best illustration of the conditions resulting from the development of the embryo of a ta in the human body, is afforded by the complaint now under c tion; and though the parasite may be met with in almost eve and tissue in the body, yet the liver is by far its most frequent that the subject may be treated once for all in the present cha hydatid tumour is derived from the development of embryo *tænia echinococcus*, each of which produces a scolex, named *ech hominis*, and these become enclosed in cysts. This tape-w fests dogs and wolves, and it is supposed that fragments are ev in their excræta, their ova are set free, become mixed with food, and are thus introduced into the alimentary canal of a being. When the embryos are liberated they bore the walls stomach with their hooks, and then migrate, usually settling in t there developing into scolices. The echinococcus also infest and it is in consequence of eating their organs that dogs bec subjects of tape-worm.

Iceland is the country in which hydatid disease is especially pr In this part of the world it is only very exceptionally met wi usually in those who have been abroad. Most cases occur middle life, and among the poorer classes.

ANATOMICAL CHARACTERS.—In the first place it will be well to des various structures which ordinarily enter into the formation of a typical hydatid —1. Externally there is a firm, whitish or yellowish, fibrous, vascular capsule, of proliferation of cellular tissue from irritation, which is adherent to the sur structures. 2. Within this, moulded as it were to its interior, but easily s from it, is a delicate cyst or bladder, elastic, greyish, semi-transparent or g t, and compared to boiled white of egg; under the microscope it is seen to of several hyaline, concentric layers, a section presenting a characteristic d appearance. The most internal layer is extremely delicate and studded with ransparent cells. The term *mother-sac* or *vesicle* is usually applied to this struc- a whole; but it has also been limited to the internal lamina just mentioned, as likewise been termed the *germinal membrane*. 3. A quantity of fluid is con- within this cyst, usually completely filling it, perfectly colourless, transparent, ery as a rule, occasionally slightly opalescent; of low specific gravity—1007 ; generally alkaline or neutral, but occasionally acid; and consisting mainly ng solution of chloride of sodium, without any albumen or any organic sub- nt said to contain succinate of soda. 4. Floating in this fluid, or attached inner surface of the mother-cyst when small, are numerous secondary or *r-cysts*, in some instances amounting to hundreds or thousands and completely e space, so that there is little or no fluid, and becoming flattened by mutual , each having precisely the same structure as the mother-sac; within the larger there may be a third generation, and rarely a fourth. 5. When the walls of the examined carefully, little whitish, opaque spots are visible on the inner surface, re the scolices of the echinococcus in various stages of development, usually l in groups or clusters, occasionally single. These may also be free in the fluid, it somewhat opaque. Each scolex is very minute, measuring from $\frac{1}{80}$th to line in length, but this and the form vary according as the head is retracted body or extended. The head presents a proboscis, four suckers, with a double characteristic curved hooks, which are movable and of unequal length; a ion separates it from the body, the latter being striated longitudinally and ely, and presenting posteriorly a depression with a pedicle, by which the fixed to the sac in its early condition. Numerous round and oval calcareous are imbedded in the tissue.

st cases there is but one tumour as above described, but sometimes there are more, though one generally predominates over the others. The size varies y, and the hydatid may attain such dimensions as completely to fill the abdo- l invade upon the chest. The daughter-cysts usually range from a millet- an egg in size, but subsequent generations are very minute. Originally the nds to be spherical. The right lobe of the liver is the most frequent seat, cyst may occupy any part, deep or superficial. Necessarily if the hydatids are s, large, or superficial, they alter more or less the dimensions and form of , giving rise to prominences. The surrounding hepatic tissue is often atrophied pressed; sometimes the healthy portion hypertrophies. Peritonitis may be ver the tumour, causing thickening and adhesions.

vents which are liable to happen in the course of hydatid disease are import- may be summed up as follows:—1. The tumour enlarges, displacing adjoin- tures and interfering with their functions, until it bursts in some direction, or ed by violence or in some other way. The opening may take place externally the abdominal or lower thoracic walls; into either pleura or lung, especially the hich is the most common direction; pericardium rarely; peritoneum; stomach ines; gall-bladder or bile-ducts; hepatic vein or inferior vena cava. 2. Inflam- and suppuration sometimes occur, either spontaneously from rapid growth; ury or operation; or from the entrance of bile. 3. If the hydatid is slow in its it not uncommonly undergoes degenerative processes as it becomes older, and y ultimately bring about a spontaneous cure. The entrance of bile is sup- metimes to induce this result. The outer capsule becomes much thickened, gular, opaque, and ultimately calcified partially or completely. This impedes rowth, and the contained hydatids compress each other, shrivel and dry up, The fluid also thickens and becomes opaque; and, in short, fatty and cal- degeneration take place throughout, until there only remains a putty-like which shreds of the vesicles and hooklets of the echinococci are imbedded, the nature of the mass. Hæmatoidine crystals are often found in it, as well much cholesterine. A cicatrix-like depression may finally be left. 4. Occa- ysts are found in which there are no echinococci. The name *acephalocyst* applied to this condition, and it has been regarded as an abortive or sterile he parasite, in which the development is arrested; or as an earlier stage of l.

n may be briefly made here to a very rare form of this disease, named *ar hydatid cyst*. The liver is found occupied by a mass, in some cases as large as a child's head or larger, consisting of a stroma of cellular tissue, usually altered considerably by fatty degeneration, in which are imbedded cells or alveoli of various sizes, enclosing a gelatinous substance, in which microscopic examination reveals fragments of the laminated membrane of hydatids, hooklets, or occasionally even perfect scolices, as well as abundant calcareous particles. The centre of the mass is very liable to undergo suppuration, thus altering its characters considerably. This arrangement of the tumour has been attributed to the embryos having been deposited in the lymphatics, blood-vessels, or ducts of the liver; or to the absence or early rupture of the external fibrous cyst, so that the parasites are able to grow and migrate in various directions, and may thus enter the different vessels.

Other organs and tissues are not uncommonly the seat of hydatid tumours along with the liver.

SYMPTOMS.—In general terms the ordinary clinical history of hydatid tumour of the liver may be summed up in the absence of any morbid sensations referable to this organ, or of any interference with its functions, or constitutional disturbance; while it presents a peculiar form of enlargement. The disease may be latent from first to last. Should the growth attain a great size, a sense of fulness and tension is often felt, and in rare cases jaundice or signs of portal obstruction arise, in consequence of pressure upon the ducts or veins, or through their being blocked up by hydatids. Surrounding structures may also be interfered with, especially the diaphragm and respiratory organs. Should the cyst rupture, the consequent symptoms depend on the direction in which this takes place, being in many instances very grave. If the opening is external, characteristic structures may be discharged. The occurrence of suppuration is indicated by the ordinary local and constitutional signs of hepatic abscess.

The *physical characters* of hydatid tumours demand particular attention. 1. The liver is increased in size, and this is generally the first thing which attracts notice. The growth is as a rule very chronic and imperceptible in its progress, but finally it may attain enormous dimensions, so as to give rise to a general enlargement of the abdomen, or it may invade upon the chest, causing it to bulge. 2. The form of the liver is altered, as evidenced by palpation and percussion; while there is often an evident tumour in some part, especially the epigastrium or hypochondrium. Smaller prominences are sometimes felt along the margins or surface, causing lobulation and irregularity. 3. Any prominent hydatid tumour is generally quite smooth, and more or less elastic or fluctuating. 4. Hydatid-fremitus is often elicited very clearly. 5. In any doubtful case it is justifiable to make an exploratory puncture with the aspirateur, and remove some of the fluid, the physical and chemical characters of which are quite characteristic. Perhaps some of the microscopic structures may come away at the same time.

It must be remarked that the signs above described are modified considerably by the degenerative and other changes which are liable to occur in the cyst. The outer wall may feel hard and bony. If the case only comes under observation when the abdomen presents a general enlargement, it is by no means easy in many instances, except by the history, to make out where the growth originated.

The multilocular cyst is said to be distinguished by being nodulated, hard, and tender; by jaundice, ascites, and enlargement of the spleen being usually present; and by its tendency to inflame and suppurate. This variety may run a very rapid course.

V. CANCEROUS AND OTHER GROWTHS.

GY.—The liver is one of the most frequent seats of internal hich may be either *primary* or *secondary*, the latter especially after cancer of the stomach. It has sometimes been attri- injury. Most cases are met with between 50 and 70 years of lisease being extremely rare before adult life. In some patients . hereditary taint. Dr. Walshe believes that hepatic cancer is amon among males, and such has been my own experience.

MICAL CHARACTERS.—Ordinarily hepatic cancer assumes the listinct nodules or tuberous masses, having characters inter- between those of scirrhus and encephaloid, approaching more variety or the other in different instances. There is a wide e as to size and number, the nodules being small at first, and enlarging until they may reach the dimensions of a child's more. Commonly several are found, unequal in size, and by lescence considerable tracts of the organ are sometimes in- Originally the shape is spherical, but when the masses reach ce they become flattened or even depressed in the centre, so sent shallow concavities or umbilications. As a rule they are rated from the surrounding tissue by any definite structure, but lly there is a distinct cyst around a mass. Generally the con- is moderately firm, but it may range from that of a soft, brain- i-fluctuating substance to that of a hard, cartilaginous tissue, amount of cancer-juice which can be expressed will vary ac- . The colour of a section is in most cases white or yellowish- ore or less dotted and streaked with red from vessels, but it extremely vascular and dark-red, resembling "fungus hæma- The proportion of cancer-cells and fibrous stroma in any mass, ved under the microscope, depends on the variety to which it

ver is enlarged in proportion to the number and size of the being often extremely large and heavy, as well as irregular. Its re more or less destroyed and compressed; the vessels and e invaded upon or obliterated; and as a result jaundice and obstructed circulation are often present. New vessels form, g in the hepatic artery. Some observers describe the cancer ing in the centre of the lobules; others in the interlobular Vhen a mass reaches the surface it excites limited peritonitis, sequent thickening and adhesions. Neighbouring tissues may ed by extension; and the lymphatic glands in the portal fissure implicated.

owth is sometimes extremely rapid, especially when the cancer Certain changes are liable to occur. The vessels of encepha- cer often give way, leading to extravasations of blood into the which afterwards undergo changes, thus giving rise to unusual ces. Very soft accumulations have burst into the peritoneum nstances. Degenerative changes frequently arise in the less ms, in the way of caseation, or of atrophy with contraction, n, and the formation of a firm cicatrix. A section frequently reticulated appearance owing to fatty degeneration.

In exceptional cases hepatic cancer is infiltrated. Melanosis, cystic cancer, and colloid have been extremely rarely met with in the liver. Recent more careful observation has shown that some of the morbid growths generally described as cancer are composed of spindle-celled sarcoma; cysts derived from obstructed ducts, and erectile tumours have also been described.

Symptoms.—Hepatic cancer is in the great majority of cases characterized by marked local disturbances, but it may be latent. At first merely a sense of discomfort and weight is experienced, soon, however, increasing to distinct pain and tenderness, which frequently become very severe, especially if the growth of the cancer is rapid, or if peritonitis is excited. The pain is often lancinating, shooting towards the back or shoulders, or over the abdomen. Jaundice and ascites are also common symptoms, being usually the result of obstruction of the main ducts and vessels by projections from the liver or glands in the fissure; ascites may be associated with chronic peritonitis. Once the jaundice begins it is usually persistent, and often becomes intense, but it may be temporary from catarrh of the ducts. The spleen is but rarely enlarged. The superficial abdominal veins are sometimes distended.

The *physical characters* of the liver indicative of cancer are:—1. Enlargement, frequently very great, rapid in its progress, and chiefly in a downward direction. 2. Alteration in shape and irregularity of outline, nodules or larger masses being felt or sometimes even seen along the surface and margins, which are not uncommonly umbilicated. 3. As a rule considerable firmness and resistance of the projections, though they occasionally have a soft elastic feel, or even yield a sensation of obscure fluctuation. 4. Occasionally friction-fremitus and sound during breathing, these being chiefly due to peritonitis.

Digestive derangements are necessarily present in most cases, and they frequently first attract attention. The cancerous cachexia is usually well-marked, with rapid wasting, debility, and anæmia. There may be pyrexia from time to time, sometimes considerable when the progress of the disease is rapid. Cancer is frequently present in other organs, either primary or secondary, especially in connection with the alimentary canal.

The progress of hepatic cancer is generally very rapid, and the disease is rarely prolonged beyond a year.

VI. CIRRHOSIS OF THE LIVER—CHRONIC ATROPHY.

Etiology and Pathology.—Undoubtedly several distinct morbid conditions of the liver have been included under the term *cirrhosis*, which have totally different modes of origin. With regard to the genuine disease, it is usually considered as resulting from a chronic interstitial inflammation, extending into the minutest portal canals, and leading to proliferation of cellular tissue between the lobules; or, as some describe, to the formation of an exudation, which organises and then contracts, with consequent pressure upon and obliteration of the vessels, and atrophy of the secreting elements. Some have attributed it to a constitutional diathesis characterised by the formation of a fibroid tissue in different organs and structures of the body, of which the morbid state of the liver is but a local development. While others still have regarded the disease as commencing in degeneration and destruction of the secreting cells, the ducts, vessels, and areolar tissue remaining, followed or not by proliferation of the latter. The important *exciting cause* of cirrhosis is abuse of alcohol, especially indulgence in ardent spirits on an empty stomach. Hence the common name "gin-drinker's liver." The alcohol being absorbed and circulating through the liver is considered either to set up inflammation or to lead to degeneration of the cells, according to the view held as to the pathology of the disease. Cirrhosis, however, is certainly occasionally met with where there is no history of intemperance, and it has then been attributed to the influence of malaria or prolonged heat; abuse of hot condiments and various articles of diet; the circulation of products of faulty digestion; or to the extension of a localised peritoneal inflammation. It is chiefly met with between 30 and 50 years of age, being rare in youth, and not common in advanced age. Males suffer more than females; and also those who from their occupation or in any other way are more exposed to the exciting cause.

ANATOMICAL CHARACTERS.—In the advanced stage of cirrhosis the morbid appearances are very characteristic. The liver is greatly contracted, wasted, and diminished in weight, sometimes even to ⅔ or ½ the original, especially the left lobe and edges, the latter being often reduced to a thin fibrous rim. The form is frequently somewhat rounded. The surface is very pale, and covered more or less with roundish prominences, varying in size from minute granules to projections or knobs ¼ to ½ an inch in diameter or even larger, like hob-nails, hence the names "granular or hob-nailed liver." They may be tolerably uniform in size, but are more commonly unequal. Local puckerings or depressions are often observed. The capsule is thickened, opaque, and inseparable, while local peritoneal adhesions and thickenings are almost constant. The consistence is remarkably dense, firm, tough, and leathery as a rule, which is best realised on making a section. This exhibits the same granular appearance as the surface, sometimes to a much more marked degree. The colour is generally a mixture of dirty-white or greyish and yellow; the former being arranged in lines or bands of different widths, sometimes extending over considerable tracts; the latter, which varies in tint, being in some specimens bright-yellow, in others almost brownish, corresponding to the granulations. The name *cirrhosis* is derived from this yellow appearance. In extreme cases, however, but little of it is evident.

The intimate changes in structure and the microscopic appearances must now be considered. The white tissue is generally supposed to be made up mainly either of fully-developed fibrous tissue, or of young connective-tissue elements in process of development, chiefly resulting from proliferation. It has, however, been described as consisting in some instances of the remains of vessels, ducts, and other tissues which have not undergone destruction. Generally this material has numerous vessels running through it, which are stated by Frerichs to be derived from the hepatic artery. The yellow nodules correspond to lobules or groups of lobules which have not yet undergone complete disintegration. The colour is chiefly due to stasis of bile, owing to pressure upon the minute ducts; it partly results, however, from fatty degeneration of the cells. A large proportion of these cells have been wholly destroyed, and most of those which remain are greatly altered, appearing shrunken or fatty, or containing pigment-granules. The degeneration begins at the circumference of the lobules, and extends towards their interior. The vessels also present important changes. Many of the smaller branches of the portal vein are compressed or obliterated, and its capillaries destroyed, so that injection of them from the main trunk is impossible. This and the larger branches are often dilated, and may be occupied by thrombi. Sometimes a considerable branch is compressed. The hepatic artery is also commonly dilated, and new capillaries form in the fibrous tissue: frequently black pigment is found in its branches. The chief divisions of the hepatic vein are not altered, but many of its capillary tributaries are obliterated, and the communications between it and the portal system more or less destroyed. The remaining capillaries are commonly in a state of fatty degeneration.

The degree to which the changes described are observed necessarily differs considerably according to the stage of the disease. In the earliest condition there can be no doubt but that the liver is enlarged, which is proved rather by clinical observation than post-mortem examination. At this time the granular appearance is absent or but slightly marked, while the entire organ is congested, and is described as being occupied by a succulent, vascular, greyish material, consisting of young connective-tissue. In exceptional instances, however, a cirrhosed liver is enlarged throughout, and even to a marked degree. This is generally due to its being associated with fatty or lardaceous disease, but not always.

The effects of cirrhosis outside the liver are highly important, and are visible on post-mortem examination, being mainly those already mentioned as resulting from obstruction of the portal circulation. Considerable anastomoses form between the hæmorrhoidal veins, and also between the superficial branches of the portal vein in the liver and the veins of the diaphragm and abdominal walls, through the peritoneal adhesions and along the suspensory ligament.

Similar changes to those observed in cirrhosis of the liver are not unfrequently met with in other organs and tissues at the same time.

A brief account will now be given of certain other forms of chronic atrophy:—

1. As the result of long-continued mechanical congestion from heart disease, the liver contracts and presents characters much resembling those of true cirrhosis, but there is an important difference, and the atrophy is rarely so marked as in the latter. It results from pressure of the distended tributaries of the hepatic vein upon the contiguous cells, causing their degeneration; hence the centre of the lobules becomes first wasted and depressed, while the circumference remains and forms granulations. Ultimately extensive depressions are produced, and more or less proliferation of connective-tissue occurs. Attacks of chronic peri-hepatitis are also common, which increase the tendency to atrophy.

2. Dr. Murchison describes a form of granular atrophy, generally independent of intemperance, in which the fibrous tissue is not increased, and the liver is softer than in health.

3. Atrophy may result from *adhesive pyle-phlebitis*, in consequence of

h the trunk or some of the branches of the portal vein are oblite- l. Cicatricial retractions are observed on the surface, with corre- ding indurations.

Another form is that due to chronic or repeated attacks of peri- titis, which induces thickening of the capsule or pressure upon the ls, while fibrous bands pass into the interior, but there is no granu- ppearance.

Syphilis not uncommonly leads to atrophy of the liver, either by ing peri-hepatitis or simple interstitial hepatitis ; or as the result of ges in gummatous deposits.

The last variety is named "red atrophy" by Rokitansky, or ronic atrophy" by Frerichs. It may be associated with the deposit igment in the minute vessels of the liver, especially after prolonged peated attacks of malarial fever ; or it sometimes follows ulcera- in the alimentary canal. The entire organ is wasted, but it differs true cirrhosis in the absence of any granulations on the surface ; in ction being dark-brown or bluish-red and homogeneous, there being or no indication of lobules ; and in the consistence being less firm. cells are often diminished in size, and filled with brown pigment- ules. The ramifications of the portal vein are destroyed, its ches ending in cæcal, club-shaped extremities.

YMPTOMS.—In all these different forms of contracted liver, the diag- ic clinical indications are derived from the evidences of interference the portal circulation, and the signs afforded by *physical examina-* . There are, however. in addition, symptoms resulting from de- gement of the secreting functions of the liver ; and others evidencing ked constitutional disturbance.

n the early stage of true cirrhosis it is customary to describe a train ymptoms which set in insidiously as a rule, but in reality they are ely those of congestion of the liver with gastro-enteric catarrh ; and gh it might be suspected that cirrhosis was being set up, should symptoms arise associated with abuse of alcohol, there is nothing acteristic about them. Occasionally the disease begins with severe l symptoms, indicating acute hepatic congestion, catarrh of the s, and gastro-enteritis, accompanied with pyrexia. For a time there physical evidences of enlargement of the liver. As the case ad- es more or less of the consequences of portal obstruction are ob- ed, viz., ascites, often extreme in amount ; enlargement of the super- l veins of the upper part of the abdomen, especially on the right side : o-enteric catarrh ; hæmorrhage from the stomach or intestines ; orrhoids ; and enlargement of the spleen. Digestive disturbances usually prominent. Although painful sensations about the hepatic n are sometimes present in the early stages, when the disease is nced there is rarely much uneasiness, if any ; there may be tender- chiefly due to peritonitis or peri-hepatitis. Jaundice also is but y a prominent symptom, being often quite absent, but more or less is observed in many cases from time to time, especially at the early d, mainly due to congestion, catarrh of the ducts, or pressure of ged glands. Extreme jaundice occasionally results from peri-hepa- or it appears towards the termination of a case, independently y obstruction. The stools almost always contain bile.

Physical characters.—Those usually noticed are :—1. Diminution in area of hepatic dulness in proportion to the contraction. 2. Granulation or nodulation of the surface, with a feeling of hardness; in short, the characters described under the morbid anatomy. Sometimes the edge of the liver can be grasped between the thumb and fingers, and the changes thus readily realized. 3. Occasionally friction-sound. Ascites often obscures the examination, but in such cases the organ can frequently be easily felt after paracentesis. It must be remembered that in some instances there is great enlargement of the liver, but the nodulated surface can then generally be readily recognised.

The constitutional disturbance is frequently very marked at last, there being considerable emaciation and weakness; a peculiar sallow, earthy complexion; a dry harsh skin; and flabbiness of tissues. Purpuric spots and blotches on the skin are sometimes visible, and there may be extensive ecchymoses, or hæmorrhages from mucous surfaces.

Course and Terminations.—The progress of cirrhosis is generally very chronic, but it may run a tolerably rapid course from the first appearance of distinctive symptoms. The chief modes of death are from gradual asthenia and exhaustion; jaundice with typhoid symptoms; lung-complications; acute peritonitis; or hæmorrhage from the alimentary canal.

The other forms of contracted liver only differ clinically from that just described in the circumstances under which they arise; and in the physical characters presented by the liver to palpation, if the organ can be felt. In the variety due to peri-hepatitis, considerable pain and tenderness are generally complained of from time to time.

VII. Tuberculosis.

Tubercle is usually observed in the liver only in connection with general acute miliary tuberculosis. Occasionally it is secondary to chronic tubercle in other parts. It may break down and form small cavities. Clinically it cannot be recognised with any certainty. The organ is usually enlarged.

VIII. Syphilitic Disease.

The morbid conditions of the liver which may result from syphilis are :—1. Lardaceous disease. 2. Peri-hepatitis. 3. Simple interstitial hepatitis, leading to general atrophy and induration. 4. Gummous hepatitis, in which gummata are deposited more or less extensively, undergoing degenerative changes and becoming surrounded by a dense fibroid tissue, from which processes extend towards the surface in various directions. The liver-tissue becomes destroyed, and deep cicatricial depressions or furrows are seen on the surface, giving rise to a lobulated appearance. During life the characters of the liver may often be determined by physical examination, in the gummatous form being enlarged. There is often pain, with tenderness; and sometimes signs of obstruction of the bile-ducts and portal vein appear. The progress is usually very chronic.

CHAPTER XLVIII.

AFFECTIONS OF THE GALL-BLADDER.

The morbid conditions to which the gall-bladder is subject can only be briefly indicated. Most of them cause enlargement of the organ, and it is important to be able to recognise the distinctive clinical characters of each form of enlargement.

1. DISTENSION WITH BILE.—When anything obstructs the common bile-duct, *e.g.*, a gall-stone, the gall-bladder becomes filled with bile and may attain enormous dimensions. There will be the usual signs of obstructive jaundice, with enlargement of the liver; while the gall-bladder is perceptible as a fluctuating tumour, sometimes reaching nearly to the iliac crest, and generally somewhat tender.

2. ACUTE INFLAMMATION AND SUPPURATION.—The mucous membrane of the gall-bladder is liable to simple catarrh, or to croupous or diphtheritic inflammation, like other mucous surfaces; but the important form of acute inflammation is that which is attended with the formation of pus in its interior, which particularly results from irritation by gall-stones, or from obstruction of the cystic duct by these. It is clinically indicated by a very painful and tender fluctuating enlargement of the gall-bladder, which may ultimately assume the characters of an abscess, or even burst; accompanied with marked rigors and pyrexia, the latter tending to become of a hectic type. It is often preceded by signs of gall-stones, but there is no jaundice or hepatic enlargement as a rule.

3. CHRONIC INFLAMMATION. HYDROPS VESICÆ FELLEÆ. DROPSY OF THE GALL-BLADDER.—If the cystic duct is obstructed for a long period, the gall-bladder may become gradually dilated by the accumulation of a clear, serous or synovial-like fluid, the product of unhealthy secretion by the mucous surface, probably partly the result of chronic catarrh; while the walls become much thinned and atrophied. The organ is more or less distended, often to an extreme degree; but there is little or no pain or fever; while jaundice is absent, and the liver is not enlarged. Occasionally the course of events is different. The liquid portions of the contents of the gall-bladder become absorbed, leaving an inspissated substance in which calcareous salts are deposited; the walls undergo thickening and contraction from chronic inflammation; and ultimately a firm puckered mass is left, enclosing a chalky pulp.

4. ACCUMULATION OF GALL-STONES.—Gall-stones are often present in the gall-bladder without affording any evidence of their existence. In some instances, however, especially when they are very numerous and large, they cause local uneasy or painful sensations, increased after food or after much exertion or jolting; as well as reflex disturbance of the stomach and other parts; and sometimes much constitutional discomfort and depression. Occasionally also they give rise to severe symptoms from time to time, by attempting to enter the cystic duct and then falling back into the gall-bladder. They may also excite inflammation or ulceration of the mucous surface, the latter ending sometimes in perforation, or

giving rise to pyæmia. In rare instances such a number of calculi collect that they form a tumour, even of considerable size, having the general characters of enlargement of the gall-bladder as regards position, shape, and mobility, but with the following distinctive characters:—1. The tumour feels hard and sometimes nodulated. 2. On palpation a peculiar sensation is experienced, owing to the rubbing together of the calculi, compared to that produced by grasping nuts or pebbles. 3. A corresponding sound may be heard on auscultation; and occasionally loud rattling is perceptible on shaking or moving the patient. Now and then local peritonitis is excited by this enlargement, so that it becomes adherent and fixed. When such a tumour exists there are necessarily more marked subjective sensations, such as weight and uneasiness, especially on moving from side to side. The course of these cases, and the growth of the enlargement are very slow.

5. Cancer.—The signs of this rare disease are:—1. Lancinating pains with much tenderness in the region of the gall-bladder. 2. A tumour, having more or less of the characters of enlarged gall-bladder, but usually feeling firm, resistant, irregular, and nodulated, without the peculiar sensation of gall-stones; being adherent and fixed; and growing rapidly. There are always evidences of cancer in other parts, with well-marked cancerous cachexia. A fistulous communication with the intestines is often formed. Gall-stones are usually present. Jaundice and vomiting are common symptoms.

Chapter XLIX.

GALL-STONES—BILIARY CALCULI—CHOLELITHIASIS.

Etiology and Pathology.—There is considerable uncertainty as to the mode of origin of gall-stones. The chief views may be thus stated:—1. That they are merely the result of inspissation and concentration of bile. 2. That they depend upon certain biliary ingredients being in excess, especially cholesterine and colouring matters. 3. That the bile has some abnormal chemical composition, either when first formed or as the consequence of subsequent changes, which prevents it from holding certain elements in solution, and hence they are deposited. Thus calculi have been attributed to deficiency of soda, with excessive acidity; excess of lime, causing a separation of pigments; decomposition of the salts of soda with the biliary acids; or decomposition of the latter, with consequent precipitation of cholesterine and pigment. 4. That they originate in plugs of mucus, epithelium, or foreign bodies, upon which the ingredients of the bile are afterwards deposited. It is highly probable that each of these views is correct in different cases, and when once the formation of a gall-stone has commenced, its increase may be due to some other cause than that which originated it. There can be no doubt but that a catarrhal state of the gall-bladder and ducts favours the production of calculi, either by ıg stagnation, or, as some believe, by the mucus then formed ng decomposition of bile, or impregnating it with carbonate of This decomposition has also been attributed by Thudicum to sorption of some ferment from the intestines.

re are some important *predisposing causes* of gall-stones, viz., ed age; the female sex; sedentary habits; habitual constipation; dulgence in animal food and stimulants; and organic diseases of er, gall-bladder, or ducts, interfering with the escape of bile. ave also been attributed to drinking water containing excess of

TOMICAL CHARACTERS.—By far the most frequent original seat of calculi is the gall-bladder, but they may be found in any portion ducts, or even in the liver itself. The number varies from one to ds or thousands; usually several are found. There is also a ange as to size, this being in an inverse ratio to the number; l are sometimes cemented together, so as to form a large con- ı. Originally most of the calculi are round or oval, but when ous, owing to mutual friction they become worn and angular, ıting flat or concave facets, or occasionally actual articulations. formed in the ducts they exhibit curious shapes, being branched al-like. As a rule gall-stones have a brownish or greenish-yellow and are opaque, but they present an endless variety of tints, white to black, blue, green, red, and other colours, according to composition; occasionally they are somewhat translucent. They ntly have a greasy or saponaceous feel, with a waxy, brittle con- e, being readily cut or crushed; sometimes they are very firm. of them sink in water when recent, but some float, and most will after having been dried. The structure is rarely homogeneous niform. In the majority of cases, after a calculus has existed for time a section reveals distinctly three parts, named from within the *nucleus*, of which there may be more than one; the *body*, is often in concentric layers, or presents a radiated appearance; he *cortex* or *crust*, this being usually smooth externally, but occa- ly wrinkled, rough, or tuberculated and warty. As a rule the become lighter in colour from the centre towards the circum- e, but not always. Sometimes a fracture presents a crystalline t The chemical composition is very variable, but the most ıon ingredients are cholesterine and bile-pigments, with a little or magnesia. To these may be added biliary and fatty acids, ally combined with lime; modified bile-pigments; phosphates; nates; salts of soda or potash in small proportions; and metals copper, and manganese). The nucleus is often made up of s and epithelium, and the former may unite the different parts. appearances differ according to the composition, which is not sarily uniform even in the same layer. It is quite impossible to ibe the characters corresponding to the various ingredients, but it e stated generally that in proportion to the amount of choles- a calculus contains it is whiter, more transparent, crystalline or ted and lamellar, and of lighter specific gravity.

iary sand or gravel is not uncommonly met with, consisting either olesterine, bile-pigment, or black pigmentary matter.

The morbid conditions which are liable to be set up by gall-stones may be stated as follows :—1. Irritation, inflammation, suppuration, or ulceration with consequent pyæmia or perforation, of the gall-bladder or ducts, perforation taking place in different directions, especially into the stomach, duodenum, peritoneum, or externally through the abdominal wall, and rarely into the colon, portal vein, pleura, pelvis of the right kidney, or vagina. Permanent fistulæ may be left. 2. Inflammation and abscesses in the liver, if lodged there; or formation of a cyst around the calculi. 3. Obstruction of some of the ducts in the liver, or of the hepatic, cystic, or common duct, with the usual consequences. 4. Obstruction of the intestines by a large calculus, this having probably entered through a fistulous communication from the gall-bladder. 5. Inflammation, ulceration, or gangrene of the bowel, with consequent perforation.

SYMPTOMS.—It is only needful here to describe those symptoms which indicate the passage of a gall-stone along the duct to the intestine—*biliary* or *hepatic colic*—these being usually severe, but not always. The attack begins with a sudden intense pain in the right hypochondrium, in some cases most excruciating, often coming on just after a meal or after effort; it is described as constricting, griping, tearing, burning, or boring, and shoots over the abdomen, round the side, to the back, or towards the right shoulder. The patient is doubled up and rolls about, just like in ordinary colic, groaning or screaming and pressing upon the abdomen, which gives some relief, there being generally no tenderness at first. The pain may subside, leaving a dull aching, but urgent paroxysms come on again at intervals. The attacks are accompanied with much exhaustion; signs of collapse; a distressed and anxious expression of countenance; faintness, which may end in actual syncope; and cramps of the abdominal muscles; but no pyrexia. Sympathetic vomiting is frequently present, and sometimes hiccup. Among occasional symptoms are spasmodic tremors or actual convulsions, and marked rigors. In the course of a day or two, should the gall-stone reach the common duct, there are as a rule the usual signs of obstructive jaundice, which may become intense, its duration depending upon that of the obstruction. When the calculus reaches the duodenum the suffering generally subsides suddenly, with a feeling of intense relief, and then the jaundice gradually disappears. In the great majority of cases biliary calculi pass on by the bowels and are discharged in the fæces, sometimes in great numbers, without producing any further mischief, and they may be detected by washing the stools through a sieve or through muslin. Very rarely they pass into the stomach and are vomited.

There are a few points of practical import which require notice. The intensity of the pain is by no means necessarily in proportion to the size of a gall-stone, but rather to its angular shape. It usually diminishes when the concretion reaches the common duct, because this is larger than the cystic duct, but it increases again as the orifice is approached. Jaundice is not a necessary accompaniment, or it may be but slight, because when the calculus is angular it leaves room for the bile to flow by, or its passage is sometimes too rapid for the appearance of jaundice; on the other hand this may become permanent and extreme, owing to permanent impaction of a gall-stone. It is very important to look the calculi in the stools, as by their shape, number, and size an ion can often be arrived at as to whether any remain behind, as as of their characters. After one large gall-stone has escaped, other ler ones often follow without causing any particular disturbance. etimes the pain subsides, but no calculus is passed, because it ns to the gall-bladder. Pain and soreness may remain after the pe of a concretion into the duodenum, owing to nervous irritability he part of the patient, or to local irritation of the nerves ; or inflam- on may be excited, indicated by pain and tenderness, with fever. symptoms of hepatic colic are occasionally merely due to the ge of grit or inspissated bile. An attack may end fatally from mere intensity of the pain and collapse, quite irrespective of the us morbid changes which a gall-stone is liable to set up, any one of h may cause death.

CHAPTER L.

ERAL DIAGNOSIS, PROGNOSIS, AND TREATMENT OF CHRONIC HEPATIC AFFECTIONS.

I. DIAGNOSIS.

main elements in the diagnosis of chronic hepatic diseases, both other affections and from each other, are as follows:—1. The al history of the patient may reveal some known cause of certain omplaints, especially abuse of alcohol; over-eating, with deficient se and general luxurious habits; prolonged residence in tropical es or malarial districts; the previous occurrence of dysentery or or syphilitic infection. Family history may afford some aid in osis, especially if indicating a cancerous taint; in some cases the nd sex of the patient also deserve consideration. 2. The consti- al condition is highly important. Thus there may be some disease which lardaceous or fatty liver is likely to be associated ; or signs of ncerous cachexia, syphilis, or cirrhosis may be evident. On the hand, the absence of any constitutional disturbance is sometimes able in diagnosis. 3. The presence or absence of symptoms refer- to the liver, as well as their nature, intensity, and the history of progress, also deserve careful attention, especially as regards pain tenderness ; jaundice; ascites and other evidences of portal obstruc- 4. Physical examination is of course highly valuable. This will esently more fully alluded to. 5. The state of other organs may much aid, especially by revealing local manifestations of some itutional disease, *e.g.*, cancer in the stomach, waxy kidney; or of morbid condition with which hepatic derangement is likely to be ated, especially ulceration in the alimentary canal, gastro-enteric h, or a disease of the heart which obstructs the circulation. 6. The ty of the progress of a case up to the time it is first seen, as well as its subsequent course, with the results of treatment are to be taken into account in doubtful cases.

Physical examination demands special attention, particularly in detecting and making out the characters of enlargements or contractions of the liver; and enlargements of the gall-bladder. For differential diagnosis of hepatic enlargements, the following points must be noted, and in the description of each individual disease an endeavour has been made to arrange the characters in the same order:—*a.* The extent, direction, and rapidity of growth. *b.* Whether the liver is normal in shape and outline, or presents outgrowths or irregularities. *c.* The conditions of the surface and margins as to smoothness, nodulation, &c. *d.* The consistence and other sensations afforded by the liver generally, as well as by any special prominences, including fluctuation and hydatid fremitus. *e.* Whether there is any evidence of local peritonitis, indicated by friction-fremitus or sound, or adhesions to the abdominal wall. *f.* Now and then it is requisite to use the aspirateur. The characters to be observed in connection with contractions of the liver and abnormal conditions of the gall-bladder have been sufficiently indicated in their respective descriptions. It is only necessary to add with regard to the gall-bladder, that it should always be noticed whether this is altered alone or along with the liver, and *vice versâ.*

It may be useful to enumerate the causes of enlarged liver. The ordinary forms are due to—1. Congestion, especially mechanical. 2. Accumulation of bile from any obstruction in the ducts. 3. Albuminoid disease. 4. Fatty infiltration. 5. Hydatid cysts. 6. Cancerous and other growths. 7. Hepatitis, especially when ending in suppuration. 8. Cirrhosis in its early stage; and in very exceptional instances even when advanced. As very rare causes may be mentioned —9. Simple hypertrophy. 10. Syphilitic gummous hepatitis. 11. Tubercle. 12. Lymphatic growths. 13. A peculiar enlargement associated with vitiligoidea.

The chief practical difficulties in making out a diagnosis which have come under my notice are as follows:—1. Hepatic enlargement, and sometimes even changes in shape and other characters, may be simulated by the normally large size of the organ in children; congenital malformation; pressure by a rickety or otherwise deformed thorax, or as the result of tight-lacing; depression by various morbid conditions in the chest, especially pleuritic effusion and tumours; elevation towards the chest by abnormal conditions in the abdomen. On the other hand they may be obscured by distension of the colon with gas, which may even give rise to signs simulating atrophy. 2. Morbid states of other structures often give rise to signs of hepatic derangement; or, on the contrary, they may put these in the background. Thus, enlargement of the liver may be simulated by a rigid and contracted state of the right rectus muscle; inflammation and suppuration in the abdominal walls; accumulation of fæces in the colon; or a tumour in connection with the right kidney, supra-renal capsule, or peritoneum. Again, a neighbouring disease, particularly scirrhus of the head of the pancreas, often interferes with the escape of bile from the liver, and thus leads to its enlargement, with jaundice. The co-existence of ascites or chronic peritonitis with effusion frequently renders physical examination unsatisfactory.

aspirateur is then most serviceable, in order to remove lso the plan of making sudden pressure over the liver. y liver disease is obscured by symptoms referable to a some other organ, *e.g.*, cancer of the stomach; and it s rise to serious disturbance of the alimentary canal. liver is enlarged along with other organs and structures particularly in cases of cancer, and then it is frequently ke out distinctly what parts are involved. 3. Sometimes s so enormous, especially in hydatid disease, as to fill d hence it becomes impossible to tell exactly where the menced. In such cases the history of its growth, as to rted from, and perhaps its greater prominence about the ay clear up the difficulty. 4. In some instances the with two or more morbid conditions, the signs being ingly, *e.g.*, cirrhosis with fatty or albuminoid disease. ndividual diseases, it may be mentioned that hydatid to be confounded with distended gall-bladder; soft euritic effusion; abscess which has become somewhat sm; cystic disease of the kidney; or hydatids outside er may be simulated by syphilitic disease; waxy liver, bined with cirrhosis, or if some parts of the liver are an others, so as to give rise to local projections; other sis attended with enlargement; multilocular hydatid

to make a few remarks relative to pain referred to the This may be simulated by painful affections of the tures, either muscular or neuralgic; gastric and duode- ither functional or organic; intestinal colic; accumula- the colon; aneurismal, pancreatic, and other tumours erves; the passage of a renal calculus; pleurisy; the pain chondriasis; or local peritonitis. The attacks due to the l-stone are generally clearly indicated by the individuals occur; the past history; and the symptoms present, these are followed by jaundice and the escape of calculi t must be borne in mind that gall-stones are not uncom- connection with organic disease of the liver or gall- e hepatalgia is difficult to make out positively. Its already been indicated.

II. PROGNOSIS.

in the case of a chronic hepatic disease depends mainly ; the degree to which the functions of the liver are in- e escape of its secretion prevented, and its circulation onstutional condition; the state of other organs; the oving any causes which may be keeping up the disease; of treatment. Fatty and lardaceous disease are very gress, and in many cases do not seem to hasten a fatal though they are but little amenable to treatment. sarily fatal, and is frequently very rapid in its course, of the softer kind. Hydatid disease is markedly may not uncommonly be attained, the patient may l paratively good health and live for many years, enga avocations of daily life, even in cases which appear less. It must be remembered that serious and son hæmorrhage from the alimentary canal is liable to From the account given of gall-stones, it will be evi many dangers attending them. Examination of an to size, number, and shape, will aid in determining and whether the attacks of hepatic colic are likely t

III. TREATMENT.

The management of cases of chronic hepatic dise ducted according to very obvious principles.

1. The diet needs careful supervision. It ofte to the constitutional condition, and therefore of a containing abundant protein elements; but it should and easily digestible as possible, and particular ca the use of alcohol, hot condiments, fatty, amylace substances, and rich articles of diet generally. I highly important to forbid all stimulants, or only and if spirits are ever needed, they should be give in restricted quantities. Anyone who is accustomed of alcohol, and particularly in ardent spirits, must b absolute necessity of relinquishing such habits. commend the patient to take much salt with food.

2. Hygienic management is of much consequence addition to the ordinary measures for improving the points which claim special notice are removal from malarial district; cessation of sedentary and luxuric a sufficient amount of exercise in the open air beir

The chief medicines which are believed to act immediately on the
influencing its secretory functions, and hence named *cholagogues*,
ercury, particularly in the form of blue-pill, calomel, and grey
er; podophyllin; nitric and muriatic acids, either externally or in
rm of baths; and taraxacum. Rutherford has found from recent
iments that rhubarb considerably increases the flow of bile. Nu-
s observations have been made with regard to the effects of mer-
nd podophyllin, and the conclusion arrived at appears to have
that they rather diminish than increase the amount of bile in
. Still clinical observation affords evidence that in certain morbid
ions, when the bile is deficient, these remedies do decidedly
se it. This is probably due to their aiding in removing some
iment to the formation of bile, or in promoting its discharge.
ison remarks respecting mercury, that it probably irritates the
part of the small intestines, so that the bile is propelled onwards
l of being reabsorbed. The best plan of administering this drug
adult is to give occasionally a tolerably full dose of calomel or
ill, either alone or combined with rhubarb, colocynth pill, and
t of henbane. For children grey powder answers best. It is
ly injurious to get into the habit of constantly taking these
ines. A dose of podophyllin now and then is also frequently very
able. A mixture containing nitro-muriatic acid with extract of
cum enjoys considerable repute, especially in congestion of the
and the earlier stages of cirrhosis, but probably these medicines
ainly through their direct action upon the alimentary mucous
rane. Sir Ranald Martin recommended the nitro-muriatic acid
ʒi of strong nitric and ʒii of hydrochloric to a gallon of water at
o 98° F.), in which the feet are placed, and then the inside of the
and lower extremities and the abdomen are sponged over freely.
bath seems to be of much benefit to those who come from tropical
es suffering from disordered liver.

Symptoms referable to the alimentary canal commonly call for
ent in connection with liver-diseases, such as those due to gastric
teric catarrh, constipation, flatulence, hæmorrhage; or there may
ganic disease at the same time affecting the stomach or intestines,
as cancer. These conditions must be treated by the usual remedies,
ially by alkalies and their carbonates, citrates, tartrates, and other
able salts; different bitter infusions or tinctures; saline aperients;
aline mineral waters, either English or continental. It is very
ible to keep the bowels as regular as possible, though not by em-
g strong purgatives. Should the patient be suffering from hæmor-
s, confection of senna or sulphur is valuable.

The two prominent symptoms so frequently calling for treatment
er-affections, viz., jaundice and ascites, have already been fully
lered. I cannot, however, refrain from again insisting upon the
tance of having recourse to the early and repeated removal of
y paracentesis in ascites associated with cirrhosis.

Local applications are frequently of service especially to relieve pain
ongestion. They include chiefly dry heat; poultices and fomen-
s. to which anodynes may be added; sinapisms; anodyne plas-
dry cupping or the removal of a little blood by leeches or cupping.

should be adopted, though it should not be delayed
much difference of opinion as to the most efficien
The principal methods advocated are :—1. Punctur
or a trochar and canula, and evacuation of the flui
subsequent injection of the cyst with some irritating
or tincture of iodine, so as to excite inflammation.
contents through a large incision. 4. Gradual ope
the repeated application of caustic potash to the ab
prominent part of the tumour. This has been do
causing adhesions and thus preventing the escape o
toneum, and it has also been had recourse to w
previous to puncture with the trochar. 5. Punc
with needles and transmission of electric shocks
authorities assert that all that is necessary is to ev
that then the parasite will die. Others consider t
excite inflammation. The balance of evidence see
favour of the more simple methods. Some reco
ment of a very small trochar, others of a large on
difference of opinion as to whether it is requisite t
of the fluid or not, some even using an exhausting
off. Murchison advocates the employment of a v
advises that the canula should be removed before t
has been drawn off, or as soon as it ceases to flow
passing a wire through the tube to see that it is n
hydatid vesicle. The object of this is to prevent
which is one of the main dangers, as it tends to
Another danger is the escape of fluid into the perit
to prevent this, pressure should be made over the
the abdomen during the removal of the canula. T
made over the most prominent part of the tumour.
advisable, but local anæsthesia may be induced.

: tube left in, the cyst being washed out with carbolic acid solution.
lifferent events which may happen in connection with hydatid
r must be treated on ordinary principles. In those countries
hydatid disease is prevalent prophylactic measures are necessary,
› prevent dogs from feeding on the offal of sheep; exclude them
slaughter-houses; give them meat thoroughly boiled; destroy
xcræta which contain tape-worms; and to physic them periodi-
(Murchison.)

The treatment of gall-stones also calls for a few remarks. During
ssage of a gall-stone the chief measures to be attended to are:—
administer narcotics and anodynes, especially opium or morphia
doses, subcutaneous injection of the latter being very valuable;
nna; hyoscyamus; chloroform and ether, either internally or by
ion. *b.* To treat certain symptoms, especially vomiting and
e. *c.* To apply dry heat, hot fomentations, poultices, or anodyne
tions constantly over the hepatic region; or to put the patient in
ı bath. Antimony and other emetics, which were formerly much
ed, as well as strong purgatives, ought to be avoided, in my
ı. Much good is effected in some cases by the treatment intro-
by Dr. Prout, of drinking a considerable quantity of a warm
ı of bicarbonate of soda (ʒi or ʒii to oj). Large warm enemata
so be beneficial. The application of a few leeches over the
region seems to be useful in prolonged cases, especially if there
ı tenderness. For the prevention of gall-stones attention to diet
giene is most essential; and the use of remedies which improve
e of the alimentary canal, or of those which act on the liver, is
en very serviceable. It has been supposed that they can be dis-
after their formation by means of a mixture of turpentine and
hloroform, alkalies, or alkaline mineral waters. It is very doubt-
ther either of these has any such effect, but alkalies and mineral
often do a great deal of good in these cases. The various con-
es which may result from gall-stones must be treated as they
Inflammation about the gall-bladder, from whatever cause.
, poultices and fomentations. If pus forms, or if in chronic cases
uid collects, it is sometimes requisite to puncture the cyst and
t, leaving an external fistula.

CHAPTER LI.

DISEASES OF THE SPLEEN.

. CHARACTERS.—1. The spleen is often diseased without giving rise to any
bid sensations. When it becomes much enlarged, it may cause a sense of
ıd tension, chiefly about the left hypochondrium. Occasionally more or less
tenderness are complained of. 2. A most important indication of splenic
, derived from the constitutional condition. In prolonged cases a state
, "splenic cachexia" is induced. This is characterised by extreme anæmia,
us membranes being pale and bloodless, and the face presenting a waxy, or

sometimes an earthy, sallow aspect; great debility; wasting, but not usually rapid; sense of prostration and dulness; shortness of breath on any exertion, with hurried breathing, chiefly due to the anæmia; tendency to hæmorrhages, especially in the form of epistaxis, bleeding from the gums, and petechiæ under the skin; œdema of the legs and eyelids, or even general dropsy. 3. Symptoms may arise from pressure of an enlarged spleen on surrounding parts, especially on the diaphragm, dyspnœa being thus increased, and pulmonary congestion and catarrh induced. Vomiting may also be excited by pressure on the stomach.

The chief aid in the diagnosis of morbid conditions of the spleen is derived from *physical examination.* The characters of a *splenic tumour* are as follows:—1. It is extra-pelvic, and occupies mainly the left hypochondrium, being felt to come from beneath the margin of the thorax. In its growth it tends towards the front of the abdomen, as well as downwards and to the right, so that ultimately it extends into other regions and comes to be superficial, while it can generally be separated posteriorly from the mass of the dorsal muscles. Percussion often shows increase in area of splenic dulness upwards towards the thorax or backwards, but it rarely reaches above the fifth rib, and does not extend to the spine. There is also an undue sense of resistance on percussion; with deficient elasticity of the ribs. 2. The form is usually very characteristic, being more or less that of the spleen exaggerated. The anterior border can be felt directed obliquely down and towards the right, sharp and thin, often presenting one or more notches or shallow excavations. The posterior edge and lower end are rounded. The outline of the spleen may occasionally actually be visible. 3. As a rule the tumour feels firm and solid; now and then it gives a sensation of elasticity, but fluctuation is extremely rare. The surface is almost always smooth, but may be irregular. 4. Another important character of splenic tumour is its great mobility. Generally it can be readily moved in all directions by manipulation, and it is more influenced by the act of respiration than any other tumour, being often felt below the ribs after a deep inspiration when previously imperceptible. Posture also affects it markedly. 5. Occasionally a splenic murmur is heard.

Some of the difficulties in recognising enlargement of the spleen require notice. 1. It is often not sufficiently large to come below the margin of the thorax, and can then only be made out by percussion. 2. Even when of some size, it may be kept up by the costo-colic fold of peritoneum, or by adhesions at its upper end. 3. Adhesions may also prevent any mobility and cause the tumour to become fixed. 4. The enlargement is sometimes so great as to obscure altogether the outline of the spleen and the characters of its margin, the latter then assuming a vertical direction. 5. Enlargement of other organs is liable to conceal splenic tumours. 6. Accumulation of flatus in the colon may interfere with its detection. The principal morbid conditions for which enlarged spleen is likely to be mistaken, or *vice versâ*, are cancer about the cardiac end of the stomach; enlarged left lobe of the liver; tumour of the omentum; and tumour in connection with the left kidney or supra-renal capsule.

SPECIAL DISEASES OF THE SPLEEN.

I. CONGESTION OR HYPERÆMIA.

ETIOLOGY.—The spleen readily becomes congested, on account of its great vascularity and the yielding nature of its capsule. After every meal it is more or less in this condition. Active hyperæmia is commonly observed in acute febrile diseases, especially in typhoid and intermittent fevers, but also in typhus, erysipelas, pyæmia, puerperal fever, and acute tuberculosis. It is said to be occasionally vicarious of menstruation. Injury or morbid deposits may cause it. Mechanical congestion follows any obstruction to the portal circulation, either direct or secondary to chronic heart and lung-affections.

ANATOMICAL CHARACTERS.—The morbid characters of a recently congested spleen are enlargement, often considerable, the capsule being stretched and smooth; increase in weight; intense redness of a dark

nd diminution in consistence, the substance of the organ in some
ces being quite pulpy or almost liquid. The amount of blood is
increased; red blood-cells are extremely abundant; and the splenic
appears increased in some cases. After long-continued or re-
l hyperæmia the spleen becomes permanently enlarged, hardened,
pertrophied.

PTOMS.—The only clinical sign of congested spleen usually
ed is that the organ is enlarged, but not as a rule to any great
, and it is liable to vary considerably. Occasionally it feels soft,
generally tolerably firm. There is no spontaneous pain in most
but tenderness is common, and may be very marked in acute
tion. Temporary general anæmia has been stated to be associated
xtreme splenic congestion.

II. HÆMORRHAGIC INFARCTION—SPLENITIS.

OLOGY AND PATHOLOGY.—The spleen is one of the organs in
emboli most frequently lodge, giving rise to hæmorrhagic infarc-
Some are of opinion that these may also arise from the forma-
local thrombi within the vessels of the organ. Occasionally con-
le inflammatory action is excited, especially when the emboli have
properties, as in typhus or pyæmia, and this is the most frequent
of splenitis. In rare cases inflammation results from injury; and it
o been stated to arise from malaria, especially in certain tropical
s; or idiopathically.

TOMICAL CHARACTERS.—Infarctions in the spleen are usually
n section of the organ, in the form of wedge-shaped masses, with
e towards the surface, often projecting somewhat; when situated
in the organ they are more or less rounded. They vary con-
ly in number and size. Originally each infarction is dark and
nd surrounded by congestion; in time, however, the ordinary
s take place, the colouring matter becoming absorbed, until the
ssumes a yellowish-white colour. Frequently caseous degeneration
ltimate absorption follows, a depressed cicatrix remaining; or it
nd in calcification. In pyæmia and similar affections the infarc-
apidly break down into a purulent fluid, at the same time the
being more or less inflamed and congested throughout. Idio-
inflammation at first cannot be distinguished from mere conges-
he spleen being enlarged, very dark, and softened. One or more
ses may form, which sometimes finally involve the entire organ,
ing converted into a mere bag of pus. An abscess occasionally
externally, or into the peritoneum, stomach, or thorax. Rarely
mes encapsuled and undergoes curative changes, its fluid portion
absorbed, so that finally only a caseous mass remains, which
alcify. The peritoneum is often inflamed over the affected part.

PTOMS.—Very rarely can embolism in the spleen and its con-
ces be recognised during life, but it may be suspected if, along
ome source of embolism, there should be rigors and pyrexia, with
igns indicating inflammation of the spleen, viz., pain and tender-
the left hypochondrium; enlargement of the organ; and vomit-
many cases. An abscess is scarcely ever diagnosed; it may

possibly give rise to a fluctuating enlargement, or even burst externally. It is attended with hectic fever, and rapid wasting. Should it rupture internally, there are the usual signs of perforation.

III. Hypertrophy—Leucocythæmia.

Etiology and Pathology.—By far the most important form of enlarged spleen is that which is due to hypertrophy of its tissue. This may follow any long-continued or repeated congestion, but is particularly observed after ague, or even after mere residence in malarial districts; and as the result of chronic portal obstruction. Under these circumstances the hypertrophy seems to be chiefly due to interference with the escape of the cells out of the spleen, and not to excessive formation. This morbid condition is most important, however, in connection with the disease named *leucocythæmia* or *leuckæmia*, which is characterised by the presence of a great excess of white corpuscles in the blood; and an increase in the lymphatic tissues in certain organs and structures, especially in the spleen and lymphatic glands, but also occasionally in the liver, kidneys, lungs, heart, thyroid gland, supra-renal capsules, and in connection with serous and mucous membranes. Virchow has described two chief forms of the affection, in one of which the spleen is alone enlarged, this being much the more common; in the other only the lymphatic glands. In some instances both are implicated. The increase in the white blood-cells is no doubt mainly due to excessive formation in the spleen or lymphatic glands, but it has also been attributed partly to diminished metamorphosis of these into red corpuscles; to their proliferation in the blood; and to a new formation by the walls of the vessels. Nothing satisfactory is known about the remote causes of this disease.

Anatomical Characters.—In hypertrophy from hyperæmia the spleen is increased in size and weight, sometimes to a great degree, but retains its normal form; its consistence is increased; and a section appears pale and dry, sometimes grey, or presents black spots or patches due to pigment. The tissue is quite normal, but increased and condensed, the trabeculæ being also thickened and firm, appearing as white traversing lines.

When the spleen is involved in leucocythæmia it is at first congested, the cellular elements at the same time increasing. Ultimately it may attain enormous dimensions, and weigh many pounds. As a rule it is abnormally firm, but not invariably. The increase of tissue soon commences, chiefly in the Malpighian corpuscles, which become much enlarged, their vessels also increasing in number, and they are seen on section as firm, whitish, irregular, scattered nodules, the surrounding pulp becoming more or less atrophied as they extend, and often much pigmented. The trabeculæ are also considerably thickened. Usually the capsule of the spleen is thickened and opaque, and adhesions often form with neighbouring structures. Hæmorrhagic infarctions or their remains are not uncommonly seen.

When the lymphatic glands are affected they become more or less enlarged, in some cases forming considerable tumours by their aggregation. They resemble in appearance and structure ordinary glands, being oft, and presenting on section a smooth uniform surface, from which turbid fluid can be expressed. The cortical portion is much thickened, nd microscopical examination only reveals that the normal elements of he gland-tissues are in excess.

In the other organs and tissues mentioned, especially the liver, the hanges associated with leucocythæmia are observed in the form of little hitish spots, consisting of a soft adenoid tissue, composed of small ells and nuclei. The liver may be occupied by considerable masses of his substance, causing it to be enlarged. These deposits are supposed o be mainly derived from infiltration of the tissue with elements coneyed by the blood from the spleen and glands, but probably they are t least in part due to local hyperplasia of the adenoid tissue normally resent in the liver.

The changes in the blood are highly important. In the splenic ariety of leucocythæmia it is found to contain an enormous number of rdinary white corpuscles ; in the lymphatic variety, there are abundant mall cells and free nuclei, like those in the glands ; and in mixed cases, s the disease approaches more one type or the other, does the relative roportion of these microscopic elements vary. Other characters of he blood are marked lowering of its specific gravity ; great diminution f red corpuscles and therefore of iron ; increase of water ; and in some nstances, according to Scherer, the presence of abnormal ingredients, such as are usually found in the spleen, viz., hypoxanthin, lactic, formic, and acetic acids. The proportion of white corpuscles differs in blood taken from different parts of the body, being highest in that of the splenic vein. After death soft yellow clots are often found in the heart and great vessels, sometimes almost purulent-looking.

SYMPTOMS.—Hypertrophy of the spleen may exist for a considerable time, and to a marked degree. without producing any evident disturbance. In many advanced cases, however, there are signs of marked splenic cachexia. Physical examination usually reveals quite distinctly he enlarged spleen.

In *leucocythæmia* the essential clinical phenomena may be summed up s :—1. More or less intense splenic cachexia, which often attains a high grade. 2. In the majority of cases the physical signs of enlarged spleen, in some instances this organ being so hypertrophied as to lead o general enlargement of the abdomen. 3. In a comparatively few cases enlarged masses of lymphatic glands, either externally, internally, or both ; and occasionally signs of enlarged liver. 4. Sometimes evidences of pressure by the spleen on surrounding structures, especially the diaphragm. 5. Peculiar changes in the blood. It is customary to describe the characters of the blood and the clot obtained after a small venesection, but these patients cannot afford to lose blood, and it is quite sufficient to prick the finger so as to get just a drop, and examine this microscopically, when the increase in white corpuscles is immediately perceptible. As a rule no subjective sensations are complained of in the abdomen, except a sense of weight and fulness, but transitory pains may be felt. There are often digestive derangements, and vomiting and diarrhœa may be prominent symptoms. Increased excretion of uric acid has been observed. The course of the disease is very chronic, and usually there is no pyrexia in its earlier stages, but there may be some irregular febrile disturbance, and towards the close the temperature is often raised persistently. Death may take place gradually from asthenia and exhaustion, frequently preceded by delirium, stupor, and coma; or more speedily from hæmorrhage, diarrhœa, and other complications.

IV. Rare Morbid Conditions.

1. Lardaceous Disease.—For the etiology, morbid anatomy, and constitutional symptoms of this condition, reference must be made to the general account already given. All that need be said here is that the deposit is in some cases limited to the Malpighian corpuscles, producing the appearance known as the "sago-spleen," in which translucent granules are observed, resembling boiled sago. Clinically the enlargement of the spleen is recognised by its very hard and dense consistence; and by its steady growth, the organ finally reaching extreme dimensions in some cases. Other organs are always involved; while there is some constitutional condition present with which albuminoid disease is associated.

2. Cancer of the spleen is almost a curiosity. It occurs in the form of nodules or masses of encephaloid, and is always secondary. During life the enlargement is recognised by its irregular and nodular character. Usually pain and tenderness are complained of. Other organs are always implicated.

3. Hydatid tumour has been in rare instances met with in the spleen, the liver being affected at the same time. It may give rise to a prominent tumour, having the usual semi-globular fluctuating character of a hydatid cyst.

4. Tubercle is chiefly met with as a part of acute miliary tuberculosis. Now and then it occurs in cases of chronic phthisis. It cannot be recognised clinically.

5. The spleen is often shrunken and atrophied, but this leads to no ill effects.

V. General Diagnosis, Prognosis, and Treatment.

Diagnosis.—Practically it is only by *physical examination* that diseases of the spleen can be positively recognised. The chief difficulties attending this have already been indicated. The general symptoms aid the diagnosis materially in advanced cases. In leucocythæmia of course examination of the blood is highly important. The history also helps in some cases, especially if it reveals exposure to malarial influence, or the previous occurrence of attacks of ague. Should there be portal obstruction, enlargement of the spleen is a necessary consequence.

Prognosis.—Acute affections of the spleen are rarely dangerous in themselves. Chronic affections are usually slow in their progress, except in the case of malignant disease, and if there is mere hypertrophy the health is often not disturbed for a long time. Treatment seems to have very little effect in reducing this hypertrophy if it once arises. Leucocythæmia has been considered an incurable disease, but recent experience indicates that it may be greatly benefited. It lasts a variable

being usually chronic, but its average duration is said to be from
14 months.
EATMENT.—No special interference is needed in acute forms of
c disease, unless an abscess should form and be recognised.
must be treated in the usual way. Quinine has a marked in-
e in reducing malarial congestion, even after it has existed for
time. When there is mechanical congestion, any impediment in
ction with the portal circulation must be removed, if possible, but
, saline purgatives act beneficially by relieving the vessels. In
rophy and leucocythæmia one of the chief objects of treatment
improve the general health and blood-state by the administration
n, mineral acids, quinine, and similar remedies, as well as by a
ious diet, change of air, and attention to hygienic measures.
es and bromides have been supposed to reduce the size of the
, but in my experience they have been of no use whatever. A
of leucocythæmia recently treated by Dr. Wilson Fox was re-
ibly benefited by phosphorus ; and in another case, under my own
the administration of this drug seemed to have a marked effect in
ing the size of the spleen and enlarged glands, and in diminishing
imber of white corpuscles in the blood. Friction over the corre-
ing region with iodide of mercury ointment has been recommended
the view of reducing the size of the spleen. Extirpation of the
has been advocated as a last resource. Various symptoms must
ated as they arise.

CHAPTER LII.

DISEASES OF THE PANCREAS.

AL CHARACTERS.—1. Pancreatic affections are frequently attended with
sensations, described as lying deep in the abdomen, a little below the epigas-
The pain often shoots in various directions, and occasionally comes on in
paroxysms, resembling those of hepatic colic. In some cases there is deep
ess. 2. Important symptoms are believed to arise from changes in the quan-
quality of the pancreatic secretion. When formed in excess, being at the
ime usually of an irritable quality, it is supposed by some to be the cause of a
pyrosis, attended with the discharge of a viscid, slimy fluid ; as well as of diar-
the stools containing a tenacious material, or being sometimes dysenteric. On
er hand, deficiency or absence of pancreatic juice from the alimentary canal,
r arising from changes in the gland tissue or obstruction in connection with the
or abnormal quality of the secretion has been considered to give rise to a cha-
stic phenomenon, viz., the passage of a large amount of fatty or oily matter in
ols, which separates from the general mass of the fæces. Frequently there is
ation at the same time, the fæces being dry and hard. Other digestive de-
ents are common, and may be partly due to the absence of pancreatic juice
e bowels. 3. Pressure upon or irritation of neighbouring structures is often a
f prominent symptoms in pancreatic disease, especially jaundice, vomiting,
ions and other gastric disturbances, and aortic pulsation. The pain is also partly
this cause in many cases, from pressure on the nerves or vertebræ, the latter
ccasionally eroded. 4. *Physical examination* may disclose a morbid condition
pancreas, but it requires to be performed very thoroughly and often repeatedly,

the stomach and colon being empty, before a satisfactory conclusion can be arrived at. The healthy pancreas can now and then be felt on making deep pressure in very thin persons with loose abdominal walls, especially if the spine is somewhat curved forwards; this is more frequently the case when the organ is enlarged and hardened. It is, however, in the detection of a tumour of the head of the pancreas that physical examination is of most value. This is distinguished by the following characters:— *a.* It is situated deeply at the back of the abdomen, in the region of the pancreas. *b.* The dimensions are always small, and the shape generally more or less rounded. *c.* The tumour is quite fixed. *d.* It feels dense and hard. It must be mentioned that marked pulsation and bruit may result from pressure of the pancreas upon the aorta. 5. Pancreatic disease is often attended with extreme emaciation, anæmia, and debility, due to the interference with nutrition and other causes.

SPECIAL DISEASES OF THE PANCREAS.

These will need but a very brief consideration, and some of them only require enumeration.

1. PANCREATITIS.—Acute inflammation of the pancreas is very rare. It is said to be characterised anatomically by hyperæmia; swelling; induration or softening; with exudation into the cellular tissue and upon the surface, occasionally ending in purulent infiltration or formation of abscesses. The last event is said to be not uncommon as the result of metastasis from the salivary glands and testis. Very rarely the inflammation ends in gangrene. The symptoms are described as dull deep-seated pain in the region of the pancreas; nausea and vomiting of a viscid liquid; thirst; constipation; and some pyrexia. Rupture of an abscess may give rise to serious symptoms.

2. The following morbid conditions may be mentioned together, viz:—(i.) So-called *hypertrophy*, which generally involves the entire gland, and is the result of chronic inflammation or long-continued mechanical congestion from portal obstruction, the pancreas being enlarged and hardened. (ii.) *Atrophy*, usually associated with senile changes; some cachexia; local disease of vessels; or pressure by surrounding disease. (iii.) *Induration* or *softening*, with or without hypertrophy or atrophy. (iv.) *Fatty infiltration* and *degeneration*. If these give rise to any symptoms at all, they are those due to deficiency or abnormal quality of pancreatic secretion. A hypertrophied organ may be felt in some cases; and occasionally it gives rise to pressure symptoms.

3. Not uncommonly *calculi* form in the pancreatic duct, which may be in large number and of some size. They interfere with the escape of the secretion. I am not aware that their passage causes any symptoms. The ducts are sometimes dilated into cysts.

4. The chief disease of the pancreas is *scirrhus of the head*. There is a difference of opinion as to the nature of this morbid condition, some pathologists regarding it as the result of cancerous deposit; others considering that it is merely due to fibroid changes resulting from chronic inflammation, and the latter affirm that the pancreas is peculiarly free from cancer, escaping often even when it exists all round. I have had the opportunity of observing five cases of this disease, and of making a post-mortem examination in four of them, and certainly in these the affected portion of the pancreas presented well-marked general and microscopic characters indicative of scirrhus cancer. The mass varies in size, but does not attain large dimensions; it has an extremely hard and dense

ce, and a whitish section. It frequently becomes adherent to and he duodenum, which may be ulcerated and greatly narrowed. o form adhesions with other structures, to which the disease extend. The pancreatic and common bile ducts as a rule bstructed. The latter is usually supposed to be closed owing e upon it by the enlarged pancreas, but this is probably more due to contraction about the orifice or in the course of the changes in its own tissues, jaundice and its accompaniments resulting. The body of the pancreas is usually enlarged; some- atrophied. Now and then serious disorganisation of neigh- rts is produced, leading to erosion of the vertebræ, perforation phragm, or the opening of a large vessel.

e is known about the causes of this disease. Generally it lderly persons, but one of the most marked cases I have met n a young man aged 23. In only one instance was there any intemperance.

MS.—The clinical history of scirrhus of the pancreas is de- lefinite and uncertain. In general terms the clinical phenomena ted as deep pain in the region of the pancreas, aching, gnaw- cinating in character, or sometimes attended with a sense of r tightness, in some cases greatly increased paroxysmally, and ntly rendered worse by food, coughing, deep breathing, move- ing on the back; deep tenderness; nausea and vomiting, in some re; various digestive disturbances, the tongue, however, being clean; jaundice, frequently intense; the passage of much fat ls, the bowels being usually constipated; the detection of a ving the characters already described; with great wasting, nd debility. As showing the irregular character of cases of e it may be mentioned that there may be no pain or tenderness o last; that symptoms due to biliary obstruction may be the inent phenomena throughout; that it may be impossible to tumour; and certainly that excess of fat in the stools is by always observed.

exceedingly rare morbid deposits in the pancreas are men- *phaloid cancer*, *colloid*, *melanosis*, and *tubercle*.

SIS.—It is only disease of the head of the pancreas that can diagnosed with any approach to certainty, and in many cases difficult to do this, at all events for some time. The chief r which it may be mistaken are affections of the stomach, about the pylorus, duodenum, and liver. The paroxysms of closely resemble those associated with the passage of a gall- ccasionally by pressing on the abdominal aorta, this disease to pulsation and bruit, simulating an aneurism. Whenever symptoms described are complained of, especially jaundice n without any obvious cause, pancreatic disease should be rne in mind. I believe it not uncommonly escapes recog- ply because it is never thought of. An important means of is to exclude as far as possible affections of the neighbouring It must be remembered that the liver is liable to be enlarged ult of the obstruction of the ducts associated with pancreatic Physical examination is most important in diagnosis, and in doubtful cases it should be thoroughly carried out again and again, by which a satisfactory conclusion might in many instances be arrived at in course of time.

Prognosis is necessarily serious in cancer of the pancreas, the disease being fatal, and seldom of long duration.

Treatment must be entirely symptomatic, directed especially against pain, vomiting, jaundice, loss of flesh and strength, anæmia, and debility.

Chapter LIII.

DISEASE OF THE SUPRA-RENAL CAPSULES—ADDISON'S DISEASE.

Etiology and Pathology.—Dr. Addison first drew attention to a series of symptoms which he believed were associated with disease of the supra-renal bodies, one of the most prominent being a peculiar discoloration or bronzing of the skin. Since his time the subject has been investigated by many observers, but there are several points bearing upon the pathology of this complaint which are still very doubtful. In the Croonian lectures for 1875, Dr. Greenhow discussed the various questions at length, and for full information the reader is referred to these lectures or to his more recent work.

The first question is whether any relation exists between the phenomena of so-called Addison's disease and a morbid condition of the supra-renal capsules. Greenhow maintains that there is such a relationship, but others deny this. With regard to the bronzing of the skin, which, however, is by no means the most important or an essential symptom of Addison's disease, this has been described in cases where there was no supra-renal mischief, but Greenhow affirms that the discoloration was different from true bronzing. On the other hand, supra-renal disease has been frequently noticed where there was no bronzing, which may be accounted for in some instances by the fact that this symptom appears at a comparatively late period, and that the progress of the complaint may be so rapid as to terminate in death before it could be developed. But, further, this leads to the question of the nature of the lesion of the supra-renal capsules in Addison's disease. Some suppose that its phenomena may be due to any morbid condition of these organs; but Greenhow holds that they are only observed in connection with a special lesion, which will be presently described. As to the mode in which disease of the supra-renal capsules produces these effects, there is strong evidence to prove that it is not through any destruction of their tissues and mere abolition of their functions, whatever these may be. These organs have a large supply of nerves, which are intimately connected with the trunk of the sympathetic in the abdomen, as well as with the phrenic and pneumogastric nerves, and through these with the cerebro-spinal centres. The morbid changes also tend to involve the nerves in their vicinity, and may even extend so as to

ate the semilunar ganglia and solar plexus. It seems highly
ble that the phenomena of Addison's disease are attributable to
mplication of such important nerves, which are first irritated, and
quently become atrophied and destroyed. The nerve lesions
been considered by some observers as arising primarily, and as
; altogether independent of supra-renal mischief.

th respect to the *exciting cause* of the special supra-renal lesion,
how states that it is frequently due to the extension of inflamma-
from diseased or injured adjacent parts. It has also been
ed in some instances to a severe strain, blow, or physical shock,
ly in the back; over-exertion; nervous shock, grief, or anxiety;
ntermittent fever.

ere are some important *predisposing causes* of Addison's disease.
much more frequent among males; is found almost exclusively
ose employed in active manual labour, and especially in connec-
with those occupations which expose to bodily injury from accident
er-exertion; and is almost confined to the laborious periods of
There may be a predisposing constitutional condition in some in-
es.

ATOMICAL CHARACTERS.—The supra-renal bodies may be the seat
e following morbid changes:—1. Acute inflammation ending in
ration. 2. Tubercle. 3. Cancer, always secondary and usually
e encephaloid variety. 4. Amyloid disease. 5. Fibroid degene-
with hardening. 6. Fatty degeneration. 7. Atrophy. 8. Hæ-
age. 9. Peculiar alterations associated with Addison's disease.
the last need be described, and the changes observed are supposed
the result of a chronic inflammatory process, the organs becoming
ated with an exudation of a low type which is converted into a
ibrous material, and this undergoes degenerative changes along
he tissues of the supra-renal capsules, which it invades upon and
ys. The affected organs are usually enlarged, firm, and nodu-
; though in rare cases they are normal or small in size. In the
stage of disease they are occupied by a softish, semi-translucent,
h or greenish-grey, apparently homogeneous substance, which on
ure to the air assumes a pinkish hue. This becomes firmer, and
goes caseous degeneration, giving rise to yellowish, opaque, cheesy
es; or not uncommonly forming a creamy or purulent-looking fluid,
g in thickness, and occupying either one large cavity in the centre
capsule, or, more frequently, several small cavities. Sometimes
ation follows, cretaceous granules or small masses being formed,
tty-like material, or finally a dry chalky mass. The grey material
e products of degeneration are always found associated together,
in very variable proportions, and gradations may be seen from
e to the other. Under the microscope the former is seen to con-
a fibrillated stroma containing numerous lymphoid corpuscles,
he caseous masses are made up of altered cells, nuclei, granular
and oil. In many cases there is great thickening of the covering
apsules, with extensive proliferation of the surrounding cellular
and the formation of firm adhesions to adjacent organs; the
ecome thus invested in a dense indurated tissue, and their
nvestment has also been found hypertrophied.

Other morbid appearances have been described in different cas Addison's disease, viz., enlargement of the neighbouring absor glands, which are either normal in structure, or firm, glistening, and in process of caseation; enlargement of the solitary glands o small intestines, and sometimes of the large; mammillations, small e moses, superficial erosions or small ulcers in the stomach; atrophy o mucous coat of the alimentary canal, with degeneration of the gla and enlargement of the spleen, which may be considerable, the c being usually dark-coloured and soft. Dr. Greenhow states tha composition of the blood does not undergo any important alterati uncomplicated cases of this complaint.

SYMPTOMS.—One of the most prominent clinical phenomena of A son's disease consists in a peculiar cachexia, which sets in graduall indefinitely without any obvious cause, characterised by incre muscular debility, languor, and indisposition for any bodily or m effort, at last amounting to extreme prostration; an aspect of listles and depression; marked anæmia, the sclerotics being pearly-w wasting, but not to any degree, nor is it always observed, while is often a peculiar tendency to the formation of fat, the subcuta fat being in some cases very abundant; remarkable feebleness o heart's action, the pulse becoming very soft, usually weak, and co sible, there being also a tendency to giddiness and faintness, som amounting to prolonged attacks of syncope, and to palpitation or tion, with breathlessness. Another characteristic feature is a g discoloration of the skin, which assumes the so-called *bronzed* a ance. This appears at very variable periods in different cases, due mainly to the presence of yellowish-brown pigment-granules *rete mucosum*, or occasionally of pigment cells. Traces of pigme be found in the superficial layers of the epidermis, with pigment g here and there in the cutis. The exact hue varies, and it b darker by degrees. It often resembles that of a mulatto, b be simply dingy or smoky, brown, yellowish-brown, greenish greyish-black, or almost black. It extends all over the body never uniform throughout, usually commencing and being most over exposed parts, as the face and neck, on the upper extr in the axillæ, and about the penis, scrotum, and navel. It sh gradually, but where the skin has been injured or irritated, t becomes much darker and presents defined margins. The pal soles sometimes exhibit spots of pigment. The mucous mem are also discoloured, the lips in some instances assuming a r hue, or irregular and ill-defined spots and patches of pigment b served upon them and on the inside of the cheeks and gums, w streaks opposite the angles of the mouth. A peculiar pigment been described in the structures of the eye, as seen with the oph scope, but the conjunctivæ always remain normal. In addition symptoms there is usually more or less pain in the epigastrium, cases extremely severe; and irritability of the stomach, with retching, or vomiting, which may be urgent and irrepressible. digestive disorders are also common, appetite being lost, and diarrhœa sometimes sets in, though constipation is the rul tongue is usually red and moist. Pain in the loins is often cor requently one or both hypochondria feel tender, and Dr. Green-as noticed sometimes a rigidity of the abdominal muscles, as if were instinctively contracted to protect deep-seated parts from re. The course of the disease is slow and chronic as a rule, but en subject to remarkable remissions, with improvement in the oms, and subsequent exacerbations. In exceptional instances the es is acute and rapid, or the disease may be latent for a long time hen run a very rapid course. Death generally results from gradual ia, there being towards the close frequent sighing or yawning, ersistent hiccup. The mind is in many cases clear to the last, he patient may be drowsy or semi-comatose, or grave nervous mena may arise. The temperature is usually low throughout, wards the close it falls considerably, the skin being cool or The urine is often diminished, of low specific gravity, and defi-in solids.

GNOSIS.—It is only necessary to mention that should symptoms of health and cachexia appear, without any evident organic mischief ount for this, Addison's disease ought to be remembered. When ronzing appears, there should be no doubt respecting the nature complaint.

GNOSIS is very grave, the disease always ending fatally, but the se may be very prolonged.

ATMENT.—All that can be done is to promote health and strength ans of a highly nutritious diet; tonics, especially quinine, tincture d or syrup of the phosphate of iron, and strychnia; general ic measures; and by maintaining the alimentary canal in order nd the avoidance of all bodily and mental excitement are im-t. Symptoms must be attended to as they arise.

CHAPTER LIV.

ABDOMINAL ANEURISM.

st important form of abdominal aneurism which comes under ice of the physician is that connected with the aorta, but one found on the cæliac axis or either of its branches, especially the on the mesenteric or renal arteries; or on one of the iliac ves-or the pathology and anatomical characters, reference must be the chapter on thoracic aneurism.

OMS AND SIGNS.—In many cases the only clinical indications inal aneurism consist in the detection of a tumour, having the sical characters of an aneurism. Often, however, there are signs re on surrounding structures; local morbid sensations; and of serious constitutional disturbance; and these may be alone rithout any physical signs of an aneurism, or only such as are ure. The *physical characters* of an abdominal aneurismal re as follows:—1. It is usually seated in some part of the the aorta, but frequently projects more to one side than the ecially towards the left. Of course it may occupy other

a sense of much resistance. 6. In many case
which is sometimes very loud and harsh, but
heard, or may be very slight or more like an
sionally it is seated beyond the aneurism.
murmur. The murmur is often influenced c
pressure.

There are a few points of practical import
1. The signs may be most evident in the bac
to make careful examination here, should ane
times there is no obvious sign except a murm
is no relation between the size of an aneuri
sation or murmur. 3. Occasionally the tun
uncommonly both pulsation and murmur are
posture, it being hence necessary to examine
is important, however, to observe, that the
disappear when the patient is placed in a kne
the hands. 4. The physical signs may chan
progress of any particular case.

The pressure-symptoms will vary with th
Among the most common are neuralgic p
severe, and shooting in different directions, o
this occasionally also causing permanent co
the hip-joint; deep gnawing pain, from
anasarca of one or both legs, with distensio
due to pressure on the vena cava or one of
micturition is affected at times; and albumi
sure on the renal veins. Wasting of the test
result of obliteration of the spermatic artery.
artery must be borne in mind as a possible ca
by pressing on the neighbouring duct and po

In some instances a subjective feeling of

d tumour, receiving an impulse from the aorta. The diagnosis
be founded on a careful consideration of all the features of the
s regards history, symptoms, and physical signs ; but it is important
ice that in all the conditions just mentioned the pulsation is but
expansile, and both it and any murmur generally disappear if the
t is placed in a kneeling attitude supported on the hands. The
sis from mere aortic pulsation requires a few words of special
ent. The chief facts in favour of this condition are as follows :—
is generally seated in the epigastrium. 2. It is observed most
only in highly nervous and anæmic persons, especially women ;
y thin individuals ; or in those who suffer much from chronic
sia. 3. There are no signs of pressure ; nor is there any pain or
ness as a rule. 4. The impulse is scarcely ever expansile and
, but merely tends in a forward direction, and is never attended
ı thrill ; there is no increase in dulness, or any evident tumour ;
a murmur is present, it is soft and blowing or whiffing, never harsh
l. Some cases are difficult to diagnose with certainty, and then
gress of the case must be watched, and the effects of treatment
ed.

ust not be forgotten that an aneurism may exist without giving
any physical signs. Occasionally, also, it presents the characters
lid tumour without any pulsation or bruit. If obscure abdominal
ms are complained of, particularly deep pain near the spine ; and
lly if there are indications that the constitution is gravely dis-
, aneurism should be thought of, and careful examination made
dly, over the back as well as in front.

ATMENT.—In addition to what has been previously stated regard-
: treatment of aneurism, it is necessary to allude to a special
l introduced for the cure of aneurism of the abdominal aorta,
e rapid-pressure treatment, first employed by Dr. W. Murray, of
stle-on-Tyne. The plan is to keep the patient well under chloro-
nd apply a tourniquet over the aorta above the tumour, main-
steady and constant pressure until all pulsation has ceased in the
n on removing the tourniquet. The blood coagulates in the sac,
rwards collateral circulation is set up. The results of this treat-
ve certainly been such as to recommend its adoption in appro-
ases, if other measures do not appear to be followed by good
If the aneurism is high up, distal pressure may possibly be of
Pain is a symptom often calling for interference, and is best
by subcutaneous injection of morphia. Posture may influence
lerably. It is highly important to attend to the state of the
organs. A belladonna plaster should be worn constantly over
ism.

ascertain whether it is increased by movement of th
jolts, as after walking, jumping, riding, or driving;
micturition, being either relieved or intensified, or ev
or after this act; and if it is influenced by any article
commonly a sympathetic pain is felt along the sperma
organ may be retracted.

2. The act of micturition is frequently disturbed. T
too frequent or almost constant desire to pass water, so
so that the patient cannot retain the urine for an instan
combined with more or less dysuria or strangury; simp
retention; and incontinence, the urine coming away inv
only at times, especially at night during sleep. The
abnormal characters. The amount passed may also va
either diminished more or less to actual suppression; or

3. Important symptoms associated with certain ren
abnormal state of the blood which they induce, especial
grouped under the term *uræmia.* The latter will be pre

4. When the kidney is enlarged, it occasionally give
upon adjoining structures.

5. Rupture of the kidney or bladder will occasion s
when attended with extravasation of urine.

6. *Physical examination* connected with the urinary
nation of the urine. *B.* Investigation for renal tumour.
the bladder and urethra, externally; by the use of th
scope; and through the rectum and vagina. For an a
tion of the bladder and urethra reference must be made
be desirable to point out the physical signs of a disten
be mentioned that in cases of renal disease it is of co
mine the heart and vessels; and to make use of the opht

A. EXAMINATION OF THE U

Examination of the urine is a matter of the deepes
the present day but too much neglected in ordinary pra
mation in other affections besides those of the urinary
remarks it is proposed to give a concise outline of t
investigation of this fluid is to be conducted, which h
Dr. W. Roberts's most valuable work. It need scarcel

due to fixed alkali or ammonia, which is proved by drying the test-paper in n air, when, if the alkalinity depends on ammonia, this evaporates and the s restored to its former colour. Further, it is very important, should the e ammoniacal, to ascertain whether it is discharged in this condition, or if subsequently from decomposition, and how soon. The specific gravity is ned by the urinometer, care being taken that this does not touch the sides om of the glass containing the urine; and that the number on the stem which nts the density is read off by looking at it on a level with the surface of the

CHEMICAL EXAMINATION.—This is carried out with the view of deter- :—*a*. The presence and proportion of certain normal constituents of urine, lly urea, uric acid, hippuric acid, chlorides, phosphates, and sulphates. presence and quantity of abnormal organic ingredients, chiefly bile, albumen, pus, and fat. *c*. The nature of any deposit. *d*. The existence of various ces introduced into the body from without, such as lead or arsenic. It is le to point out the tests employed for the most important of these materials.

.—The qualitative test for urea is to add pure nitric acid to some urine care- ncentrated by evaporation in a water-bath, when a crystalline precipitate of of urea is thrown down, the crystals of which appear under the microscope as mbic or hexagonal plates. *Quantitative estimation.*—An approximate know- f the amount of urea excreted daily, sufficient for ordinary clinical purposes, is d by collecting the whole of the urine passed in the 24 hours, and taking cific gravity of a mixed specimen, provided it does not contain sugar or a. A table has been drawn up by Professor Haughton showing the relations the quantity of urine, its specific gravity, and the amount of urea. For determination the *volumetric method* of Liebig is that generally employed. nds upon the fact that urea forms with mercuric nitrate a precipitate of defi- nposition. For this process three solutions are required, viz., 1. One con- of a volume of a cold saturated solution of barytic nitrate with two volumes ated baryta-water. 2. A standard solution of mercuric nitrate. 3. A solution nate of soda, about gr. xx to ʒi. A measured quantity of the urine is first rith half its bulk of the baryta solution, in order to precipitate the sulphates sphates, which are then separated by filtration, a drop or two of the filtrate urther tested to see that these are entirely removed, and if they are not more olution must be added. A certain quantity of the filtrate is then taken, and curial solution very cautiously dropped into it from a graduated burette until s to become turbid, the amount required to produce this effect being noted No precipitate falls until all the chloride of sodium present has been decom- und the quantity required for this must be subtracted in the subsequent cal- s from the total volume added. As soon as a precipitate forms, the mercurial is to be allowed to flow in freely at first, and afterwards again gradually, ure being stirred with a glass rod. In order to ascertain when the whole of has been precipitated, a little of the carbonate of soda solution is placed on porcelain surface, and a drop of the precipitated mixture added to it by the glass rod; as soon as a yellow tinge is thus produced, it indicates that the the urea has been thrown down. The matter then becomes merely one of on, the mercurial solution being of such a strength that each cubic cen- ised *after the decomposition of the chlorides* corresponds to 0·01 gramme of

cid.—The test for the presence of uric acid is to place a little of the sub- pposed to contain it on a porcelain dish, add a little nitric acid, evaporate pirit-lamp until a yellowish-red residue is left, and finally touch this when a glass rod dipped in solution of caustic ammonia. A characteristic olet colour is immediately brought out, due to the production of murexide. the acid from urine, it is requisite to add excess of strong hydrochloric or d to a specimen, and let it stand for 24 hours. The uric acid is then pre- in a crystalline form, and may be tested as above. This is also the method llowed for its *quantitative estimation*, though it is not very accurate, a quantity of urine being taken, and the precipitate collected on a weighed ich is afterwards dried and weighed.

egard to the inorganic acids, it can only be stated that phosphoric is best by the ammonio-magnesian test; hydrochloric by argentic nitrate; and by barytic nitrate. The *quantitative estimation* of these substances presents so many practical difficulties, and their proportion is liable to so many variations from different causes, that its consideration would be quite beyond the province of this work.

Albumen.—The two most reliable tests for albumen are *heat* and *nitric acid*, by which it is coagulated and precipitated.

a. The heat-test is best performed by placing some urine in a test-tube, and heating its upper portion by means of the spirit-lamp, this being then compared with the lower part, and thus the slightest opalescence can be detected. There are some important precautions to be observed. 1. It is essential to see that the urine is acid, and should it be alkaline a few drops of acetic acid must be added. 2. The portion of urine employed should be quite transparent and clear, and if there is any permanent turbidity it ought to be filtered; but when this is due to urates, all that is necessary is to pass the tube two or three times along the flame, by which these are immediately dissolved, and then the upper part may be further heated. 3. The portion that is being tested must be boiled, as when the proportion of albumen is small it is only then that cloudiness is observed. The rapidity of coagulation is in proportion to the quantity of albumen present. 4. After heating it is well to add a drop or two of nitric acid, as, if the urine is only faintly acid, earthy phosphates may be precipitated and thus give rise to turbidity. These, however, are immediately dissolved by the acid.

b. The addition of nitric acid to cold urine is, with certain precautions, a very delicate test for albumen. The plan is to place some urine in a test-tube, incline the latter, and gradually pour strong acid down along its side, so that from its higher specific gravity it may sink to the bottom without mixing. It has also been recommended to put some acid in a tube, and pour the urine upon this. At the junction of the two liquids more or less turbidity is observed, which spreads upwards through the stratum of urine. The chief fallacies with regard to the nitric acid test are as follows:—1. If only a little is added to the urine, the albumen may not be precipitated; and, on the other hand, if a considerable quantity is suddenly mixed with it, the same result may follow, even though there is much albumen present. 2. Cloudiness may not be observed for two or three minutes if the proportion of albumen is very small, and therefore the contiguous strata must be watched for this period. 3. If the urine is highly concentrated, the addition of nitric acid is liable to cause precipitation of urates; in this case, however, the cloudiness begins at the surface of the urine and spreads downwards, while heat dissolves the precipitate instantly. 4. When there is great excess of urea, the acid may cause its precipitation, but this occurs very slowly, and the deposit is crystalline. 5. Opalescence of the urine may be due to cubebs or copaiba, and this is sometimes increased by adding nitric acid. They are recognised by their odour, and by the effects of heat, which diminishes the opalescence and prevents any turbidity with nitric acid.

Quantitative examination.—For ordinary clinical purposes a sufficiently exact estimation of the amount of albumen present in a specimen of urine may be obtained by adding a little acetic acid to some of it in a test-tube, boiling, and then setting the specimen aside until the coagulated particles have all subsided, when the depth of the deposit can be compared with that of the urine, the proportion being expressed as "almost solid," ¾, ½, ¼, ⅛th, or as mere "cloudiness" or "a trace." Sometimes the precipitate from a measured quantity of the urine is collected on a weighed filter, which is washed, dried, and again weighed. Other methods have been employed, but they need not be described. Before estimating the amount of urea and other urinary ingredients, it is requisite to remove any albumen present by carefully acidulating with acetic acid, heating *just to the boiling point*, and filtering.

Sugar.—Grape-sugar is the variety met with in urine. It has been stated by many observers to be present in healthy urine, but if so, it is only in such minute proportion as to be practically of no consequence in a clinical point of view.

Qualitative tests.—1. *Reduction-test.* This is by far the most reliable and it depends upon the power which grape-sugar possesses of reducing certain metallic oxides to a lower degree of oxidation or to the metallic state. A salt of copper is usually employed, cupric oxide being reduced to cuprous, which falls as a precipitate. There are two chief modifications of the test, viz., Trommer's and Fehling's. *a. Trommer's.* A drop or two of a weak solution of cupric sulphate is added to some of the urine in a test-tube, and then about half its bulk of liquor potassæ, care being taken that sufficient is added to dissolve all the copper salt. On boiling this mixture, which should be quite clear and free from any precipitate, and of a bluish or bluish-green-our, an orange-red precipitate of cuprous oxide falls, which subsequently changes reddish-brown. This method is for several reasons unsatisfactory, and Fehling's much more reliable. *b. Fehling's.* Here a standard solution is made use of, comsed of cupric sulphate (40 grammes); potassic tartrate (160 grammes); liquor sodæ, sp. gr. 1·12 (750 grammes); with distilled water to 1154·5 cubic centimetres. is solution is very prone to decompose, racemic acid being produced from the taric, which also reduces cupric oxide, and therefore it should be always kept in comtely-filled and thoroughly-stoppered bottles, in a cool place, away from the light. e proper mode of using this test-solution is as follows :—A drachm or two of it laced in a tube and heated over the spirit-lamp until it boils; if any decomposition taken place, a precipitate of cuprous oxide will be thrown down in a minute or , and should this happen the test-solution is unsatisfactory, and it is best to prepare esh specimen. When the solution is satisfactory, if the urine is supposed to cona considerable amount of sugar, a drop or two of it is to be added while the solu- is boiling, when a brick-red precipitate of cuprous oxide falls immediately, and ore urine is added the deposit becomes yellow. Care must be taken under these umstances not to add too much urine, as great excess of sugar will cause the pretate to be redissolved, producing a clear yellow solution. If there is only a small portion of sugar present, the urine must be poured in until nearly as much as the ntity of test-solution employed has been added, but on no account must the quan- exceed an equal bulk. The mixture is again to be boiled, when, if a small quan- of sugar is present, it assumes an intense opaque yellowish-green appearance, and rly a bright yellow deposit subsides. If there is no immediate precipitation, the ture must be set aside in a warm place to cool gradually, when if only a very ute proportion of sugar is present, it by degrees loses its transparency and assumes ht-greenish opacity or milkiness, which is quite characteristic (W. Roberts). It ighly important to avoid boiling for any length of time, as this is quite unnecessary, le uric acid and other urinary ingredients have the power of reducing cupric oxide r prolonged boiling.

Moore's test.—This consists in mixing equal quantities of the suspected urine liquor potassæ in a test-tube, and boiling the upper portion. A change of colour bserved to a more or less deep brown, or if there is much sugar present, it may me almost black. This is by no means a reliable test, for it cannot detect small ntities of sugar; while urine which is concentrated and high-coloured, or which ains excess of phosphates or much albumen, will become darkened on boiling with or potassæ, and this is particularly the case with markedly albuminous urine if the or potassæ has become impregnated with lead from having been kept in glass les.

Fermentation test.—A small quantity of German yeast is placed in a test-tube, h is then quite filled with the urine, inverted over a shallow dish or saucer conng some of the same, and set aside in a warm place for some hours. If sugar is ent fermentation goes on, carbonic anhydride is set free and collects at the top of tube, gradually expelling the urine. The gas may be tested by a lighted taper. s is not a delicate test. Dr. W. Roberts makes use of the loss of specific gravity e urine after having undergone this process, both for indicating the presence of r and its amount.

Hassall's test.—Dr. Hassall considers the growth of the yeast-plant (torula visiæ) in urine, visible on microscopic examination, as certain evidence of the ence of sugar. There are several reasons why this test is not very practicable.

uantitative estimation.—For diabetic urine, where a large quantity of sugar is ed daily, the specific gravity will give an approximate idea of the proportion harged. For accurate analysis, however, the following are the chief methods pted. 1. *Volumetric analysis*—10 c.c. of Fehling's solution are placed in a flask boiled, and some of the urine, either alone or diluted with a certain proportion water, according to the amount of sugar present, is added by degrees from a luated burette, until the blue colour has entirely disappeared, which can be obed by holding the flask between the eye and the light after each addition, allowit to stand for a minute so that the sediment may subside. The above amount is mposed by 1 grain of sugar, and from this the whole quantity of sugar excreted be determined. 2. *Differential-density method.*—The loss of density in the urine r fermentation is considered by Dr. W. Roberts as giving very accurate inforion as to the quantity of sugar present. Each degree of density lost corresponds grain of sugar in every fluid ounce of urine. 3. The *polariscope* is sometimes employed to estimate the quantity of sugar, provided the urine is transparent, this being determined by the degree to which the plane of polarisation is rotated to the right.

In both qualitative and quantitative testing for sugar in urine, it has been recommended first to filter this fluid through animal charcoal.

(iii.) MICROSCOPICAL EXAMINATION.—The objects which may be discovered in urine by the aid of the microscope are:—*a.* Extraneous materials, such as fragments of cotton wool or flax, hairs, woody fibres, starch granules, oil globules. *b.* Unorganised particles, crystalline or amorphous, including chiefly uric acid and urates, oxalates of lime, phosphates, cystine, xanthine, leucine, and tyrosine. *c.* Organised bodies, viz., renal or other epithelium, renal casts, blood corpuscles, pus-cells, cancer cells, fragments of hydatids, pigment, fat, spermatozoa, or low vital organisms, viz., vibriones, mould fungus, torulæ, and sarcinæ. In order to examine deposits microscopically, a quantity of the urine must be set aside in a conical or cylindrical glass, the supernatant fluid being poured off after standing, and a drop of the sediment then placed on a glass slide. Not uncommonly the microscope is employed also to examine deposits formed during chemical reactions; and, on the other hand, the effects of chemical reagents on objects observed under the microscope sometimes give valuable information.

URINARY DEPOSITS.—It will be well now to consider deposits in urine separately, and to describe the chief characters by which those ordinarily met with are recognised. In examining them certain general characters must be first noticed, including their amount; colour and general aspect; mode of aggregation and deposit, whether amorphous, crystalline, or flocculent; and their apparent density and manner of precipitation, which may be observed by shaking up some of the specimen and allowing it to stand. Next they must be submitted to the action of heat; nitric and acetic acids; and liquor potassæ, to test whether they are soluble by these agencies. Finally some of the sediment must be examined microscopically. The principal deposits, with their main characters, are as follows:—

1. *Uric Acid.*—The urine containing this deposit is always very acid; generally it is mixed with urates and forms some time after the discharge of the urine. To the naked eye it is presented as more or less brown or brownish-red crystals, either forming a superficial film, adhering to the sides of the vessel, or falling as a heavy reddish deposit. The crystals are not soluble by heat or dilute acids, but are dissolved by strong alkalies. Chemically they may be recognised by the murexid test; microscopically they are distinguished by their colour and form, the latter being primarily that of a rhombic prism or lozenge with pointed ends, but the crystals present numerous diversities, becoming ovoid or oval tablets, barrel-shaped, quadrangular, cubes, hexagonal, rod-like, stellate, rosette-like, &c. If a drop of liquor potassæ is added they are dissolved at once, but may be reprecipitated as hexagonal plates by adding a drop of acetic acid.

2. *Urates.*—These are very common even in health. As a rule they appear as *amorphous urates*, which consist of salts of potash, soda, ammonia, and lime, in variable proportions. The conditions favourable to their deposit are a high specific gravity. very acid reaction, and low temperature. They form more or less speedily after the discharge of the urine. The precipitate is quite amorphous, pulverulent, and loose; sinks with tolerable rapidity; and presents a variable colour, such as milky, fawn, orange, pink, deep-red, or purplish, owing to the urates carrying down the urinary pigments. A film forms on the surface and sides of the containing glass. Heat dissolves the precipitate very speedily and completely, and so does liquor potassæ. Microscopically it appears as minute amorphous granules, of variable size, more or less dark and opaque. Urates of soda and ammonia are occasionally deposited in a *crystalline* form, the former as a whitish or yellowish sediment which sinks rapidly, and usually forms in the bladder; the latter generally as a dense white precipitate in urine which has decomposed and become strongly ammoniacal. They appear as globular, dark, opaque particles, from which project spiny crystals, straight or curved. Urate of ammonia also occurs as minute dumb-bells.

3. *Oxalate of lime.*—This forms but a very slight colourless deposit, usually in highly coloured and acid urine. It crystallises in fine lines on the interior of the glass, while the sediment is described by Dr. W. Roberts as consisting of two parts—a soft, pale grey, mucous-like portion at the bottom; and overlying this a snow-white, denser layer, with an undulating but sharply limited surface. Oxalate of lime is not dissolved by heat, acetic acid, or liquor potassæ, but is speedily soluble in mineral acids. It crystallizes either in the form of minute octahedra, very short in one axis; or as

biconcave circular or oval discs with rounded margins. Under the microscope the former vary in appearance according to their position, but commonly they present a characteristic envelope-like appearance, exhibiting a square surface crossed diagonally by two lines. The latter are presented as dumb-bells or ovoids and circles.

4. *Phosphates.*—These are deposited in alkaline urine as a rule, but occasionally in that which is neutral or faintly acid. They are not dissolved by boiling, which even increases the precipitate, giving rise to turbidity and causing the phosphates to fall in flakes. A drop of acid dissolves them instantly. Three varieties of phosphates are met with as urinary deposits. *a. Amorphous phosphate of lime* or *bone-earth.* This occurs as a whitish, light, flocculent sediment, with a superficial, iridescent film. Microscopically it presents irregular groups or patches of minute pale granules. *b. Crystallised phosphate of lime* or *stellar-phosphate.* Of rare occurrence, the crystals assume very various forms, but most of them resemble crystalline rods or needles, distinct or grouped in various ways. *c. Phosphate of ammonia and magnesia—Triple phosphate.* This is the most common form, being generally mixed with the amorphous phosphate. The precipitate is quite white, while brilliant colourless crystals are seen forming a film on the surface of the urine, and studding the sides of the glass. Under the microscope the crystals are usually very characteristic, appearing as triangular prisms with bevelled ends, but the primary form is liable to numerous variations.

5. *Carbonate of lime* occasionally falls as an amorphous deposit along with phosphates, and it is said to be now and then seen as crystals.

6. *Cystine.*—The urine in which this rare substance is found is turbid on being passed, yellowish-green, having an oily aspect, and a peculiar sweet-briar odour. It is faintly acid, but very prone to decomposition, becoming green and evolving hydric sulphide. The deposit on standing appears abundant and light, but it weighs very little. This is not dissolved by heat or acetic acid, the latter causing increased precipitation, but it is soluble in mineral acids and caustic ammonia, being afterwards deposited from the latter solution by spontaneous evaporation. Microscopically the crystals appear as brilliant, colourless, hexagonal tablets, having a pearly lustre, often overlapping each other, or arranged in rosettes. Cystine also crystallises in square prisms.

7. *Leucine—Tyrosine.*—These are stated to form a greenish-yellow sediment, tyrosine appearing under the microscope as delicate needles grouped in globular masses or bundles; leucine as dark globules, like fat.

8. *Fat.*—The chief condition in which a deposit of fat is observed is in the so-called *chylous urine.* It causes the liquid to assume a whitish, opaque, and milky aspect, which disappears on the addition of ether, the urine becoming transparent and clear. On standing the fat collects on the surface as a creamy layer. Under the microscope it appears in the form of extremely fine molecules.

The material named *kiesteine* may be also alluded to here. This is a peculiar whitish pellicle which sometimes forms on the surface of the urine after standing for a few days, and formerly supposed to be a characteristic sign of pregnancy, but it is now known that such is not the case. It consists of abundant fat globules, crystals of phosphates, and the mould-fungus.

9. *Mucus and Epithelium.*—All urines contain a small quantity of these elements, the epithelium being shed from the genito-urinary passages. A light cloud subsides on standing, and the cells may be seen on microscopic examination, differing in character according to the part whence they are derived. In some cases mucus is in considerable quantity. It does not become ropy on adding liquor potassæ. In connection with certain diseased conditions, the epithelium of the bladder, ureters, pelvis of the kidney, or renal tubules may be present in the urine. The extra-renal cells present such various and curious shapes as to have been mistaken for cancer-cells. Renal epithelium cells may be separate or in patches; healthy in appearance, atrophied, granular, fatty, or quite disintegrated. Usually they are associated with casts.

10. *Pus.*—If pus is present in any quantity the urine is turbid on being passed, and does not become clear on boiling. A yellowish-white sediment forms, and if the urine is ammoniacal, or if solution of potash or ammonia is added, the pus assumes the characters of a ropy, viscid, tenacious material, which can be drawn out into strings. There is necessarily some albumen present, but it is never abundant when due to pus alone. Under the microscope pus-cells are seen, but they are frequently much altered in decomposed urine.

11. *Blood.*—Urine containing only a little blood may not give any indication of this to the naked eye, but it often presents a characteristic smoky appearance; when more abundant the fluid has a more or less deep pink or red colour, until it may look like pure blood. Sometimes the blood is separate from the general mass of urine, and it may be in distinct coagula, or these may form on standing. A brownish, grumous, flocculent deposit falls after a time. The urine is necessarily albuminous. Red corpuscles are visible on microscopic examination, but if the urine is very dilute they are liable to be distended and thus lose their normal characters; or if it is ammoniacal they speedily alter in shape and break up. Vermiform coagula or casts may be visible under the microscope. In certain conditions the urine contains more or less of the colouring matter of the blood, with albumen, but without corpuscles or fibrin.

12. *Renal casts.*—Materials are exuded into the tubules in certain affections of the kidneys, which coagulate there, forming moulds or casts, and these are washed away by the urine, affording information, when viewed under the microscope, of the highest importance as regards the condition of these organs. As a rule they form but a slight cloudy sediment, but sometimes a considerable white deposit falls. Microscopic examination can alone positively reveal the presence of casts, and it is advisable to make this on a few occasions before coming to any positive conclusion, and also to repeat it frequently during the course of a case. In some instances the examination has to be conducted with the greatest care before they are detected, and it has been recommended to add acetic acid so as to precipitate uric acid, which will carry down the casts along with it.

The chief varieties met with are as follows, two or more kinds being commonly observed together:—*a. Blood-casts*, consisting either of accumulations of corpuscles, or of fibrinous casts studded with these. *b. Epithelial casts*, usually of some size, and presenting renal epithelium-cells on the surface or imbedded in their substance, frequently somewhat changed from their normal condition. *c. Granular casts*, usually of moderate size, and characterised by being more or less granular and opaque in appearance, the granules being either coarse or fine, and consisting of protein or fat; these are generally mixed to a variable degree with other elements, such as altered epithelium or oxalates; and also with free granules. On the addition of acetic acid under the microscope, if the granules consist of protein they disappear; if of fat they become more evident. Granular casts are divided by some authorities into *large* and *small*. *d. Fatty casts*, which exhibit scattered oil-globules, or collections of these as dark botryoidal masses. *e. Hyaline, transparent, or waxy casts*, varying considerably in diameter, and therefore divided into *large* and *small*: they have either a perfectly clear, transparent, and glassy aspect, or present faint markings on the surface, or a dimly molecular appearance. Sometimes a few nuclei or epithelium scales are visible upon them. In some cases they can only be seen after the addition of iodine or magenta solution. *f. Pus-casts*, composed of moulded accumulations of pus-corpuscles.

It is in connection with certain forms of Bright's disease of the kidney that casts are so important, and there are certain conclusions which may be arrived at as a general rule from studying their characters. 1. If they consist chiefly of the blood or epithelial varieties, they indicate an early stage of disease, and the condition of the epithelium may be gathered from the characters of the cells on the casts. 2. Fine hyaline casts are supposed to come from tubules still covered with epithelium, and when they follow the above, show that the disease is subsiding. 3. Large hyaline casts are believed to be formed in tubules deprived of their epithelium, and therefore to indicate grave organic changes in the kidneys. 4. Abundant granular casts also point to advanced disease, and they are frequently mixed with free granules. 5. Fatty casts are very serious, as proving fatty degeneration with destruction of the epithelium.

B. RENAL TUMOUR.

A tumour connected with the kidney has the following general characters:—1. It is extra-pelvic, occupying mainly one or other lumbar region, and it cannot be separated from the mass of muscles behind. It, however, increases in a forward direction to a variable degree, sometimes attaining an enormous size and giving rise to general enlargement of the abdomen. 2. The shape is generally more or less that of the kidney, the borders being rounded, but irregularity is not unfrequently observed. 3. As a rule the consistence is firm; occasionally there is a feeling of softness, or even distinct fluctuation. 4. The tumour is almost or quite fixed, not being altered by manipulation or respiratory movements. 5. Percussion reveals dulness extending back to the spine, with tympanitic note in front, unless the tumour becomes extremely large. 6. In some cases it may be advisable to use the aspirateur or exploratory trochar.

It will be convenient in this connection to allude to certain peculiarities in the position and shape of the kidneys, which may give rise to forms of abdominal tumour. 1. *Movable* or *floating kidney.* Normally the kidneys are nearly fixed, but occasionally one or both, especially the right, are displaced and more or less freely mobile, floating about in the cavity of the abdomen. This has been by far most frequently observed in females, chiefly after repeated or difficult parturition. It has also been attributed to congenital looseness of the attachments; sudden or repeated violent effort; pressure by tight-lacing; rapid absorption of the investing adipose tissue in fat people; increase of weight during the menstrual periods from congestion, with consequent falling-down of the kidneys; and to these organs being dragged down by a hernia. The kidney is felt as a tumour, having the exact form and feel of the healthy organ; and usually lying, when the patient is erect, in an oblique position, directed upwards and outwards, about midway between the margin of the thorax and the umbilicus. It is mobile in different directions by change of posture, manipulation, and respiratory movements. In some cases it may be grasped in the hand, this causing a peculiar sickening sensation to the patient. Percussion generally yields a muffled tympanitic sound. On examining the corresponding lumbar region, it will be found flattened or depressed and tympanitic on percussion, owing to the absence of the kidney. In some instances the displaced organ becomes enlarged and painful from time to time, it is supposed from pressure on its own duct leading to retention of urine and consequent inflammation. As a result of repeated attacks of this kind it may become permanently fixed by adhesions. Among the most frequent symptoms accompanying this abnormal condition are uneasiness or dragging pain, increased by walking or standing; neuralgic pains; disturbances of the alimentary canal; and other disorders due to compression or irritation. The urine is generally normal, but micturition may be frequent or painful. During the inflammatory attacks severe symptoms may be experienced. 2. Now and then the kidney is fixed in some abnormal position, this being either congenital or acquired. The displaced organ is recognised by presenting the characters of the normal kidney, though the shape is usually somewhat altered; and by the signs of its being absent from its proper situation. 3. *Horse-shoe kidney.* Here the two organs are united by an isthmus passing across between their lower ends. This may possibly be felt in very thin persons with loose abdominal walls, and be mistaken for a tumour.

C. Distended Bladder.

A distended bladder is liable to be met with in medical practice, and it may simulate a tumour or general enlargement of the abdomen. Its characters are as follows:—*a.* It occupies mainly the hypogastrium, extending upwards and laterally to a variable extent, and being quite symmetrical. *b.* The shape is conical, the apex being upwards. *c.* Fluctuation is usually perceptible. *d.* There is dulness corresponding to the enlargement in position and shape, while laterally and above tympanitic sound can be elicited. *e.* By examination per rectum the distended bladder may be felt. *f.* The use of the catheter must never be forgotten; or, if this cannot be passed, a small trochar or the aspirateur may be inserted above the pubes.

Chapter LVI.

ON CERTAIN ABNORMAL CONDITIONS OF THE URINE.

I. Albuminuria.—The chief causes of albuminuria are:—1. Admixture of blood or some of its elements; chyle or lymph; pus from any source; or semen. 2. Renal congestion, particularly mechanical due to obstructive cardiac diseases, chronic lung affections, or pressure upon the renal veins by a tumour or a pregnant uterus. 3. Acute febrile and inflammatory diseases, *e.g.*, the exanthemata, cholera, diphtheria, pyæmia, ague, pneumonia, serous inflammations, rheumatic fever, and the pyrexial condition which arises in the course of chronic diseases, such as phthisis. 4. Certain affections attended with an unhealthy state of the blood and relaxation of the tissues, as purpura and scurvy, these conditions being supposed also partly to account for its occurrence in pregnancy. 5. Acute and chronic Bright's disease, the albuminuria being then mainly due to organic changes in the kidneys. 6. Chronic lead-poisoning; also poisoning by inhalation of arseniuretted hydrogen or carbonic anhydride. 7. The use of a highly albuminous diet, as well as some forms of dyspepsia, may cause the urine to become slightly albuminous temporarily.

II. PYURIA.—The sources of pus in the urine are:—1. Abscess in the kidney. 2. Pyelitis. 3. Cystitis. 4. Urethral inflammation, especially gonorrhœa. 5. Leucorrhœa in females. 6. The rupture of any neighbouring abscess into the urinary passages.

III. CHYLOUS URINE—CHYLURIA.—In this condition the urine generally presents a whitish, opaque, and milky aspect, but occasionally it is somewhat bloody. It contains albumen, fibrin, and fat in variable proportions. On standing a soft coagulum forms in the urine, while the fat collects on the surface as a creamy layer. The microscope reveals, in addition to the fat-molecules, granular nucleated corpuscles resembling chyle-corpuscles. Drs. Lewis and Cunningham have discovered a minute nematoid worm, to which they attribute the morbid condition. Chylous urine is chiefly met with in tropical climates, in some countries being endemic. Frequently considerable emaciation and debility accompany this condition. The morbid elements in the urine are generally supposed to be derived directly from the blood in the kidneys; but Dr. W. Roberts believes that they come from the absorbent vessels in the urinary passages, which hypertrophy and give way, so that their contents become mixed with the urine.

IV. HÆMATURIA.—The blood in hæmaturia may come from the kidneys; pelves or ureters; bladder; urethra; or, in females, it may be connected with uterine and vaginal hæmorrhage, including ordinary menstruation. Excluding the latter the causes may be arranged thus:—1. Traumatic, *e.g.*, external injury affecting any part of the urinary apparatus; severe exertion and straining; injury by instruments; and laceration of the mucous membrane of the pelvis of the kidney, ureters, bladder, or urethra by a calculus. 2. Renal affections, viz., congestion, including the active hyperæmia induced by certain articles, especially turpentine and cantharides; acute Bright's disease; suppurative nephritis; cancer; tubercle; renal embolism; minute calculi in the tubules; hydatids and other parasites. 3. Affections of either pelvis or ureter, viz., cancer, tubercle, and parasitic diseases. 4. Affections of the bladder, viz., congestion; acute cystitis; cancer, especially if of a villous and fungous nature; varicose veins. 5. Gonorrhœa and other urethral inflammations. 6. Endemic. This calls for special notice, being a form of hæmaturia observed in certain hot climates, especially the Mauritius, which has now been proved to be due to a small parasite (bilharzia hæmatobia), affecting the mucous membrane of the pelvis, of the kidney and bladder. 7. Abnormal conditions of the blood, rly in connection with purpura and scurvy, but also in malignant holera, and other affections. 8. Vicarious, chiefly of the men- scharge. 9. Mental emotion in rare instances.

ACTERS.—For purposes of diagnosis it is highly important to hether blood in urine is constantly passed or only at intervals certain circumstances, as after riding, jolting, or taking certain the mode of its discharge, whether before or after the urine or ith it, and also if it escapes independently of micturition; its ; and the degree in which the urine and blood are mingled, they are intimately mixed, or more or less separate, or if the rms distinct coagula.

characters of hæmaturia associated with most of the local mentioned will be hereafter pointed out. At present all that said is that in renal hæmaturia the blood and urine are inti- nixed, the colour being frequently smoky, and under the micro- ninute moulded coagula or casts are usually visible, being in ses numerous and decolorised, and accompanied by other renal es; in bleeding from the pelves and ureters there is also an mixture, and moulded vermiform coagula of considerable nay be discharged; in vesical hæmorrhage the blood is expelled r only towards the end of the act of micturition; while in the variety it may escape or be pressed out independently of mic- and when urine is passed, blood precedes it or colours the first and then the urine may become quite clear, blood again appear- ne close of the act. It may, however, flow back into the bladder e urethra, and thus colour the urine contained in this organ. s sometimes purposely mixed with urine by hysterical patients lingerers.

TMENT.—This must be conducted on exactly the same principles of other hæmorrhages. The most valuable internal astringents aturia are gallic or tannic acid, acetate of lead, or full doses e sulphuric acid, combined with a little opium. The subcu- injection of ergotine deserves trial. The local use of cold is hly beneficial often, in the form of ice to the loins, hypogastrium, eum, or of cold injections into the bladder; astringent injections permissible in some forms of vesical hæmorrhage. Dry cupping e kidneys is frequently very useful when the blood comes from rgans, and occasionally local removal of blood is desirable. e can be applied in the case of urethral hæmorrhage, and for rpose it may be requisite to pass a catheter or sound. After æmaturia it is important to watch the case for some time, as may remain in the tubules and set up serious mischief.

ÆMATINURIA.—The urine occasionally contains more or less of uring matter and albumen of blood, but no corpuscles or fibrin, this condition the above term has been applied. This has been d in connection with septic and malignant fevers; occasionally ura and scurvy; after poisoning by arseniuretted hydrogen or c anhydride; and as a distinct affection, named *paroxysmal* or *tent hæmatinuria*, which seems to be chiefly caused originally by ut has also been attributed to injury over the renal region, and e to malaria. Pathologically it has been supposed to be due to the red corpuscles of the blood becoming disintegrated and dissolved; or to a nervous disturbance leading to temporary dilatation of the renal vessels, with the escape of some of their contents without rupture. It is highly probable that in some of the cases described corpuscles have been present in the urine originally, which have subsequently broken up and become dissolved.

Intermittent hæmatinuria comes on in sudden and usually irregular paroxysms, varying much in their frequency in different cases, only occurring during the day, and generally lasting from three to twelve hours; being preceded for a brief period by chills or rigors, languor, a sense of weight or dull pain over the kidneys, pain or stiffness in the legs, occasionally retraction of the testicles, nausea and vomiting. As a rule there is no pyrexia, and the temperature is in some cases below the normal. The urine becomes very dark, resembling porter or port-wine; usually turbid; highly albuminous; and deposits a chocolate-coloured sediment, which microscopically is seen to consist chiefly of granular matter, sometimes with hæmatine crystals, and often a few dark granular casts and oxalate of lime. In the intervals the urine seems quite normal, and the change to the healthy condition may be also quite sudden.

TREATMENT.—Full doses of quinine and iron have been found of most service in the treatment of this complaint.

CHAPTER LVII.

URÆMIA—URÆMIC POISONING.

THERE are certain symptoms grouped under the above term, which are the result of interference with the urinary functions. The conditions under which they arise may be stated generally as :—1. Diseases of the kidneys, especially Bright's disease, or nervous and vascular derangements of these organs which prevent them from doing their excretory work properly. 2. Obstruction of both ureters, so that the urine which is formed cannot escape into the bladder, though it is a remarkable fact that the symptoms are by no means characteristic in these cases. 3. Retention of the urine in the bladder from any cause, when the uræmia is supposed to be partly due to re-absorption of the urinary elements.

SYMPTOMS.—The clinical phenomena indicating uræmia are headache, sometimes fixed behind the neck or at the back of the orbits, or a sense of weight and pressure over the forehead or vertex; increased irritability of the voluntary muscles, evidenced by twitchings and fits of epileptiform convulsions, in the latter the face being pale and the pupils dilated, several fits sometimes occurring in rapid succession, with more or less stupor in the intervals, though consciousness is often partially restored; cerebral disturbance, usually in the direction of drowsiness, heaviness and confusion of ideas, culminating in stupor or profound coma, delirium being only exceptionally observed; disturbance of vision, in the way of dimness of sight from time to time, or actual temporary blindness, there being no necessary organic changes revealed by the ophthalmoscope afness in rare instances; vomiting and diarrhœa, the matters dis- rged containing a quantity of ammonia, which may be perceptible the smell; occasionally an urinous or ammoniacal odour of the ath and sweat; and possibly in exceptional cases paroxysms of pnœa. The exact combination of symptoms in any individual e varies considerably, as well as the mode and rapidity of their onset. a rule they come on gradually, beginning with headache and vomiting. asionally they commence with a perfectly sudden apoplectiform or eptiform attack; or with blindness, or severe vomiting.

DIAGNOSIS.—Certain cases of uræmia are particularly liable to be taken for apoplexy, epilepsy, or opium-poisoning. The diagnostic nts will be considered in a future chapter; at present I would only w attention to the great importance of testing the urine in all cases sudden insensibility. Cases of belladonna-poisoning may also simu- e uræmia. The possibility of headache, disturbances of sight or hear- , and vomiting or diarrhœa being due to this cause must not be for- ten.

PATHOLOGY.—Most authorities regard the phenomena of uræmia as e to the accumulation in the blood of some poisonous materials, the culation of which through the nervous and muscular systems occasions e effects described. Formerly they were attributed to non-excretion f urea, or to carbonate of ammonia resulting from the decomposition f this substance, but more recent observations seem to indicate that the ief poisonous agents are materials produced as the result of imperfect ue-metamorphosis, which in the normal state of things should be ther converted into urea and uric acid, and then excreted. The tery state of the blood; and œdema with anæmia of the brain-sub- nce, have also been made to account for the phenomena of uræmia.

TREATMENT.—In the uræmic state the main indications are to remove y cause of urinary obstruction; to use measures for promoting ex- tion of urine, especially free dry-cupping or heat and moisture over e loins; to encourage the action of the skin by the aid of warm, our, or hot-air baths; and to treat symptoms. Inhalation of chloro- m is useful for the epileptiform attacks. Venesection is often em- yed for apoplectic seizures, but is not admissible should there be nced disease of the kidneys. Sinapisms may be applied to the ck and limbs. Vomiting must be treated in the usual way, but it is t advisable to check diarrhœa too speedily, and a brisk purgative is t unfrequently serviceable.

CHAPTER LVIII.

RENAL CONGESTION—EMBOLISM—INFARCTION.

OLOGY.—Congestion of the kidneys may be active or mechanical. e former, also named catarrhal nephritis, may result from :—1. Any exial condition, but especially that accompanying the exanthemata. Cold and wet. 3. Certain medicines when used in excess, viz., tharides, turpentine, *nitre, cubebs*, or copaiba. 4. Irritating urine in diabetes. 5. Morbid formations in the kidney, and emboli. 6. The early stage of inflammation. 7. It is said hypertrophy of the left ventricle; or possibly active dilatation of the vessels, as in cases of hysteria. Mechanical hyperæmia is a common consequence of:—1. Some cardiac or pulmonary disease interfering with the general venous circulation.—2. Pressure upon one or both renal veins, or upon the inferior vena cava above them, by abdominal tumours or a pregnant uterus.

ANATOMICAL CHARACTERS.—At first the kidneys present the characters ordinarily accompanying congestion, viz., enlargement and increase in weight; increased redness with points of vascularity, especially corresponding to the Malpighian bodies; and sometimes minute ecchymoses. In many forms of active hyperæmia there is a catarrhal state of the ducts of the pyramids, with shedding of epithelium. After mechanical congestion has lasted for some time, the usual serious changes are set up, leading to grave disorganization of the kidneys, which become contracted, indurated, sometimes granular or irregular, the cortical substance ultimately undergoing more or less atrophy. Microscopical examination reveals alteration in shape of the tubes, with thickening of their walls; changes in the epithelium, which is often destroyed; increase in the intertubular connective tissue; and permanent distension of the minute vessels. By some authorities this condition is looked upon as a form of Bright's disease.

Emboli not unfrequently lodge in the kidneys and give rise to infarctions, almost invariably confined to the cortical portion; differing in size; usually well-defined and wedge-shaped, with the base towards the surface. At first they are dark red, but become decolorised from the centre towards the circumference, leaving yellow masses, which may be ultimately absorbed, depressed cicatrices alone remaining. Rarely an infarction softens and breaks down, forming a pseudo-abscess, or it is said that even actual pus may be produced.

SYMPTOMS.—Congestion of the kidneys is ordinarily indicated by the urine becoming diminished in quantity, high-coloured, concentrated, and depositing urates abundantly on standing; afterwards containing some albumen, occasionally a little blood or clear fibrinous casts, with a few renal epithelium cells. In some forms of active hyperæmia, however, there is a copious flow of pale, watery urine, of low specific gravity. There may be a sense of fulness about the loins, or even a certain degree of heavy pain, and tenderness is frequently complained of. If the congestion subsides, the urine assumes its normal characters, but if it continues and leads to organic changes in the kidneys, this fluid presents more marked and permanent changes, to be hereafter considered. As a rule there are no symptoms indicative of renal embolism. If the embolus is large, it may cause a sudden severe pain in the renal region, shooting towards the pelvis, with albuminuria or hæmaturia. Should an abscess form, there might be symptoms indicating this event.

TREATMENT.—If renal congestion calls for any interference, the main point is to remove or mitigate its cause as soon as possible, especially in the mechanical form. Rest in the recumbent posture; free dry cupping or heat and moisture over the loins, or sometimes the removal of a little blood; the warm bath; and active purgation are the chief direct remedies to be employed.

CHAPTER LIX.

URATIVE INFLAMMATION IN CONNECTION WITH THE KIDNEYS.

I. SUPPURATIVE NEPHRITIS—RENAL ABSCESS.

ogy.—The causes of renal inflammation ending in suppuration
-1. Injury from without. 2. Some direct irritation in the substance
: kidney, especially from a calculus. 3. Suppuration in the urinary
ges, that in the kidney being set up either by extension or inde-
ntly, the latter probably being the result of a kind of local pyæmia.
nbolism. 5. General pyæmia. 6. Extension of inflammation
surrounding structures.

atomical Characters.—Whatever may be the origin of the in-
mation, the alterations in the kidney are in most cases similar at
viz., enlargement; hyperæmia, much blood flowing on section; and
ntion in consistence. It is supposed that an interstitial exudation
forms. Suppuration usually commences in separate points, which
d and coalesce so as to form one or more abscesses, these varying
in size. In most forms of the disease only one kidney is usually in-
d, and there is finally but a single abscess, which may attain large
nsions and open into the pelvis of the kidney; externally in the
; into the peritoneum or sub-peritoneal tissue around; intestines; or
x. Occasionally inspissation of the contents takes place, followed
seation and calcification, a cure being thus effected. In pyæmia
: are numerous scattered abscesses of small size. It is said that
s sometimes infiltrated through the kidneys; also that it may form
n the tubules.

mptoms.—Acute suppurative nephritis is generally accompanied
local pain in the corresponding lumbar region, often severe, in-
ed by movement, frequently shooting towards the bladder, testis,
igh; as well as with tenderness. The testis may be drawn up.
urine is diminished in quantity and concentrated, or even actually
ressed, frequently containing some blood or merely a little albumen,
these may be quite absent. As a rule there are distinct rigors,
wed by marked pyrexia, which has a great tendency to assume a
oid type, especially when suppuration commences, this being ac-
anied with repeated shiverings. Sympathetic vomiting is not
mmon. Uræmic symptoms are also liable to arise. Should a
abscess form, it presents as an elastic or fluctuating fulness or
ur, usually in the lumbar region, where it may afterwards burst.
opens into the pelvis of the kidney, a copious discharge of pus
place along with the urine, and this may afterwards continue
tently or at intervals. Various symptoms may result from the
ng of an abscess into other parts. When the kidneys are involved
emia, there are no prominent local signs; and such is often the
lso when the renal disease follows some morbid condition of the
y passages, when *it frequently runs* a somewhat chronic course.

II. Pyelitis—Inflammation of the Pelvis of the Kidney—Pyonephrosis.

Etiology.—Pyelitis signifies inflammation involving the mucous lining of the pelvis and infundibula of the kidney. Its important causes are:—1. Direct irritation by foreign matters lodged there, especially a calculus or gravel, parasites, and blood-clots. 2. Morbid deposits, viz., cancer, tubercle. 3. Extension of inflammation from the bladder along the ureter. 4. Irritation by accumulated urine, resulting from closure of the ureter by pressure or internal obstruction, especially if this has become decomposed. In rare instances pyelitis seems to set in idiopathically, from exposure to cold and wet or other injurious influences. A certain degree of it may also arise in the course of various febrile affections; in organic affections of the kidneys; diabetes; and from the use of certain drugs, such as turpentine or cantharides.

Anatomical Characters.—Pyelitis may be acute or chronic, and the appearances vary accordingly. The acute form, in which the inflammation is usually catarrhal, is characterised by injection of the membrane, occasionally with slight ecchymoses or extravasations of blood; relaxation and softening; shedding of epithelium; and subsequently discharge of a purulent mucus or actual pus. Occasionally diphtheritic or croupous inflammation is observed, along with a similar condition of other mucous surfaces. The chronic variety may either follow the acute or commence as such. The membrane is then pale, though some of its veins may be permanently distended; often grey or slate-coloured from pigment; much thickened and firm. Pus is constantly formed, and if there is no obstruction it flows away with the urine; should there be an impediment to its escape it accumulates in the pelvis, which it distends more and more, giving rise to the condition named *pyonephrosis;* here it is commonly mixed with other materials, such as urine, which is usually decomposed and ammoniacal, deposits or incrustations of uric acid and urates or phosphates, calculi or other materials which may have excited the pyelitis, or blood. By degrees the substance of the kidney is compressed and invaded upon, until ultimately it may be completely destroyed, a mere sac remaining containing pus and other matters. In other instances distinct disease is set up in different parts of the kidney—*pyelo-nephritis;* or it may simply shrivel up and atrophy. The accumulation may burst in any of the directions which renal abscess takes; or occasionally ulceration of the mucous membrane is set up by some foreign body, and perforation occurs before any particular distension is observed. In some cases the pus becomes inspissated, and abundant calcareous deposits are formed, or even imperfect bone, the cavity contracting and shrivelling up.

Symptoms.—In the majority of cases pyelitis is preceded or accompanied by symptoms due to its cause, *e.g.*, those of calculus or disease of the bladder. The local clinical phenomena associated with this complaint are uneasiness or pain over one or both lumbar regions, often of an aching character or shooting downwards, with tenderness and a sense of weakness; generally frequent micturition; changes in the urine; and in some instances the presence of a tumour. The alterations in the urine may be the only deviation from health. It is often ased in quantity; generally acid; and at first contains a little l intimately mixed, with mucus and the variously-shaped epithe- cells detached from the pelvis and infundibula; gradually it nes mixed more and more with pus, until finally this may be nt in large quantity, and it comes away persistently so long as is no obstruction to its escape. Albumen is only observed in pro- n to the admixture of blood and pus. Some important differences oticed in the characters of the urine under certain circumstances. : flow of pus along the ureter is impeded in any way, as by a us, the urine may become quite natural, provided only one kidney olved; if both are implicated, or if the closure of the ureter is plete, the quantity of pus is merely lessened. Should the obstruc- e removed, a copious flow of purulent urine again takes place; ay be repeated from time to time, or the obstruction may remain nently. Further, if the urine is retained it tends to decompose, s then frequently discharged in an ammoniacal state. Should als accumulate in the pelvis of the kidney, a fulness or tumour is l, having the general characters of renal enlargement, with an or fluctuating feel. This will be subject to increase in size l there be obstruction in the ureter from time to time, becoming lso more painful and tender, and it may suddenly subside as the iment is removed. Occasionally it attains very large dimensions. general symptoms are those of pyrexia in the acute form, pre- by rigors. When suppuration is set up there are commonly ed rigors, in some cases recurring at regular intervals, and in pro- cases signs of hectic fever appear. The bowels are often dis- , there being either diarrhœa or obstinate constipation, the latter pressure on the colon. If the kidneys become independently ated, symptoms of Bright's disease arise. In some cases recovery place, provided only one kidney is affected and the cause of the aint can be removed, though often with complete destruction of the ed organ. Most commonly, however, death ultimately happens radual exhaustion. This event may result also from perforation ure of the distended pelvis, the symptoms differing according to ection in which the opening takes place.

III. PERINEPHRITIS.

his form of inflammation the tissue surrounding the kidney is ated, the process usually terminating in suppuration. It is caused ry, cold, or previous suppurative nephritis or pyelitis. Clinically ents a history very much like that of the diseases just mentioned, distinguished by the absence of any disturbance of the renal func- or of any changes in the urine. There may also be a greater y and superficialness of the pain and tenderness, with more l exacerbation on movement; and subcutaneous œdema in one region. The abscess generally opens behind, but may rupture us other directions.

CHAPTER LX.

BRIGHT'S DISEASE.

NUMEROUS and diverse have been the arrangements by different authors of the morbid conditions included within the term "Bright's disease." In general language it is employed to signify any structural disease of the kidneys which leads to albuminuria and dropsy. Primarily it is divided into *acute* and *chronic* forms.

I. ACUTE BRIGHT'S DISEASE. ACUTE DESQUAMATIVE NEPHRITIS. ACUTE TUBAL NEPHRITIS.

ETIOLOGY.—In the large majority of cases acute Bright's disease is associated with scarlatina; or results from "taking cold." It may follow excessive drinking; or be set up occasionally in the course of other exanthemata besides scarlet fever, *e.g.*, measles or typhus fever; in the collapse stage of cholera; it is said after ague or exposure to malaria; or during pregnancy. There is good reason for believing that the pathological cause in many of these conditions is that the functions of the kidneys are abnormally exercised, these organs having to excrete materials either formed in excess or of an unusual character, or such as ought to be removed by the skin. The chief *predisposing causes* are the early period of life; want of cleanliness of the skin; intemperate habits; and occupations which involve exposure. In some cases Bright's disease has probably existed in a chronic form without giving rise to any evident symptoms, until one of the above causes makes it assume an acute character.

ANATOMICAL CHARACTERS.—The kidneys are enlarged and increased in weight, in most cases considerably. At first they are deeply congested, the surface and a section presenting a deep dusky-red colour, with darker spots corresponding to the Malpighian corpuscles or to minute hæmorrhages, while the superficial veins are distended, and a quantity of bloody fluid escapes on section. The surface is quite smooth, and the capsule easily separated. The enlargement is mainly due to increase in the cortical substance, which is found to be much thickened, softened, lacerable, and friable. The pelvis and infundibula are also injected, and a bloody liquid is often found here. In a more advanced stage the colour of the cortical portion changes, becoming either more or less white, yellowish-white, or pale-buff, opaque and dotted, or presenting a mottled surface of red and white; while the pyramids remain dark-red and striated, red lines radiating in a fan-like manner from their bases.

Microscopic examination reveals capillary distension; fibrinous exudation within the tubules of the kidney; as well as red blood-corpuscles, with extremely abundant epithelium-cells, which become detached, rapidly increase in number, and accumulate in the tubules, many of which appear crammed full of cells, and some dilated. Most of the epithelium particles are altered, being enlarged; cloudy or ıore or less granular from the presence of protein granules or of fat; or quite disintegrated; there being also abundant s resulting from proliferation. They accumulate more and ıe disease advances, and hence the pale colour, this also lting from compression of the vessels. In some tubules the may be completely detached, only hyaline fibrinous moulds These changes are much more evident in the cortical than dal portion of the kidneys.

cases morbid appearances due to complications are commonly specially serous inflammations; endocarditis; pneumonia or Dropsy and its consequences are generally present. In the heart is hypertrophied.

OGY.—Acute Bright's disease is essentially an intense catarrhal on of the tubules of the kidney. As a result, in addition y engorgement and rupture, the epithelial cells undergo rapid n. The renal functions are greatly impeded, and hence the omes overloaded with excrementitious matters, as well as d highly deficient in albumen and red corpuscles. The ormed in the kidneys are washed away by the urine, in which sible on microscopic examination.

IS.—As a rule the onset of acute Bright's disease is definite d; frequently it sets in with chilliness or rigors, general dache, and nausea or severe vomiting; in other cases dropsy cending is the earliest symptom observed; and occasionally enomena first attract attention. When the disease is esta- e characteristic clinical signs include peculiar changes in the re or less general anasarca, frequently with effusion into ties or œdema of organs; extreme pallor, puffiness, and dry- e skin; a tendency to uræmia, serous inflammations, endo- neumonia or bronchitis; and pyrexia. Generally there is pain with tenderness over the renal regions, but these sensa- ot prominent; micturition also is in most cases too frequent, at night, though the quantity of urine passed is greatly, and sometimes it is almost or quite suppressed. The urine ischarged has the following characters:—it is dark in colour, s of pigment and the presence of blood, the latter often o assume a smoky, brown, or dark-red tint; the specific gravity 025 to 1030, 1040, or more; the reaction is almost always ıormal odour is replaced by one compared to that of beef- washings of flesh or whey; an abundant sediment forms, flocculent; while urates are frequently deposited. Chemical n reveals abundance of albumen, the urine sometimes almost solid on boiling. The excretion of urea and inor- is greatly diminished, but uric acid is about normal. Under cope the deposit is seen to consist of red blood-corpuscles, in s much altered in appearance; renal epithelium-cells, usually ess swollen, cloudy or granular, or partially disintegrated; f these in the form of nuclei or granular matter; extra-renal ; amorphous particles of fibrine; and numerous casts, chiefly *d* and *epithelial* varieties at first, and of medium size, with a r small *hyaline* and some opaque *granular* casts. The casts change during the progress of a case, and it is very important to study these alterations; not uncommonly a little fat appears in connection with these and the epithelium, which disappears as the disease subsides.

Dropsy often comes on with great rapidity, in some cases rendering a patient irrecognizable in a few hours, while the face assumes a characteristic blanched, pasty, and puffy aspect. Hydrothorax, ascites, and œdema of the lungs are common, and œdema glottidis sometimes proves highly dangerous. The patient generally feels dull and heavy, or complains of headache, while distinct uræmic symptoms are liable to arise at any time. Inflammatory complications will be indicated by their special signs, those chiefly to be borne in mind being pericarditis, pleurisy, peritonitis, endocarditis, bronchitis, and pneumonia. Fever is often high, with a full and hard pulse; while there is complete loss of appetite, great thirst, and usually constipation. The blood is hyperinotic.

Dr. Sibson (Lumleian Lectures, 1874), has drawn special attention to certain signs in connection with the heart and vessels in cases of Bright's disease, and in the acute form he frequently found the following:—tension and hardness of the radial artery; a second beat over the aorta in the first and second right spaces; an intensified metallic second sound and muffled first sound over the aorta; reduplication of the first sound, variously distributed, but usually best heard over the septum ventriculorum; and in most cases a doubled second sound. The left ventricle was hypertrophied in many instances, but in others this effect of Bright's disease was prevented by the co-existence of some wasting and exhausting complaint.

Course, Duration, and Terminations.—Acute Bright's disease presents considerable variations in these respects. Recovery may follow speedily or gradually. Complete restoration is indicated by disappearance of the dropsy; subsidence of pyrexia and return of the functional activity of the skin; and by the urine becoming abundant, clear, and of low specific gravity, while blood, albumen, and casts disappear, many of the latter assuming the *hyaline* character during the progress towards convalescence. Some fatty changes may be noticed, but they disappear in a favourable case. As a rule the dropsy subsides before the albuminuria, and the latter may hold on for a considerable time. Not uncommonly acute Bright's disease passes into a chronic form. Death may result from dropsy affecting important parts, such as the glottis; inflammatory complications; or uræmia.

II. Chronic Bright's Disease.

There are certain well-marked varieties of this complaint recognised by most authors. The subject will, perhaps, be presented most clearly by first pointing out the general causes and clinical features of the disease; and then considering the main facts pertaining to each special type.

General Etiology.—The chief causes of chronic Bright's disease are:—1. A previous acute attack. 2. Constant or frequent exposure to cold, wet, or sudden changes of temperature. 3. Abuse of alcohol, particularly of ardent spirits. Dr. Dickinson has, however, attempted to prove that this cause has been greatly exaggerated. 4. Some constiutional diathesis or blood-poisoning, especially gout, syphilis, tubercular or scrofulous disease, chronic saturnism, and the fatty diathesis. The opinion is held by some pathologists that all forms of Bright's disease are of constitutional origin, the renal affection being but a local development of a general disorder. 5. Chronic disease of the pelvis of the kidney, bladder, urethra, or prostate gland. 6. Pregnancy.

Predisposing causes.—Chronic Bright's disease is more prevalent among males, probably from their more frequent exposure to its exciting causes; in adults; in those whose occupation involves exposure to cold and wet or sudden changes (*e.g.*, cabmen, labourers, puddlers, workers in glass), or greater temptations to intemperance; and among the poor. Want of cleanliness of the skin is a predisposing cause, and this is often combined with exposure and intemperance, the three together being peculiarly prone to originate Bright's disease.

GENERAL CLINICAL HISTORY.—In general terms the symptoms of chronic Bright's disease comprehend morbid conditions of the urine, especially albuminuria, the presence of casts and renal epithelium or sometimes of blood, and diminution in the quantity of urea and other urinary ingredients excreted; frequent micturition, particularly by night; dropsical accumulations, liable to come and go, or to alter their seat rapidly; deficient action of the skin, which is almost always dry, and often rough and harsh; changes in the blood, which becomes hydræmic and deficient in albumen and red corpuscles, with consequent pallor or sallowness of the skin, shortness of breath, and other symptoms, while excretory elements accumulate in it. Sometimes uneasiness or tenderness is experienced over the region of the kidneys. Headache and giddiness are frequently complained of, and serious uræmic symptoms are liable to arise at any moment. Serous inflammations, endocarditis, bronchitis, and pneumonia are also to be feared. Derangements of the digestive organs are very common, in the way of loss of appetite, dyspeptic symptoms, nausea or vomiting, flatulence, and irregularities of the bowels. Other complications liable to be met with are phthisis; cardiac disease; morbid conditions of the vessels; and hepatic affections. In certain forms of Bright's disease apoplexy is frequent. The signs in connection with the heart and vessels described under acute Bright's disease were also noticed by Sibson in many cases of the different chronic forms, which likewise tend to originate hypertrophy of the left ventricle.

As regards the mode of onset, chronic Bright's disease not uncommonly remains after an acute attack; in most cases, however, it sets in gradually, and the affection may be quite latent until some grave uræmic or other symptoms reveal the serious condition present. In other instances there may only be albuminuria or slight dropsy. The disease is generally subject to remissions and subacute or acute exacerbations, the latter often coming on from a slight or even without any obvious cause. The duration is very variable, some cases lasting many years, and it differs in the several forms. Death is usually hastened at the close by uræmia; serous inflammations; pneumonia or bronchitis; dropsy, either on account of its dangerous situation or from its exciting erysipelas or gangrene; or apoplexy. A few cases terminate gradually by asthenia; in others death results from independent complications, such as phthisis. Recovery may ensue even after the disease has existed for a considerable time.

It is requisite to draw special attention to certain changes in connection with the eye. The occurrence of temporary attacks of disturbance of vision in uræmia has already been alluded to. A form of amaurosis is, however, met with in Bright's disease, attended with definite morbid changes in the retina, as observed with the ophthalmoscope, viz., albuminuric retinitis and hæmorrhages. The loss of sight under these circumstances creeps on slowly and is permanent, though usually liable to sudden increase from various causes, with subsequent improvement. At first the appearances noticed are increased vascularity, with enlargement and tortuosity of the retinal veins, but shrinking of the arteries; and slight swelling around the disc, the margin of which becomes indistinct, while it becomes suffused and dark-red, a grey filmy exudation afterwards forming. The more characteristic appearances, however, are noticed later on, being due to the presence of numerous whitish or yellowish-white brilliant-looking spots or patches around the disc; with hæmorrhagic extravasations into the retina in the same locality. By the increase and union of the patches the disc is often surrounded with a zone, "the inner line of which is irregularly circular, or melts into the grey interval and the disc itself, while the outer presents salient angles, which correspond to the course of the larger vessels" (Allbutt). Whitish streaks are also seen radiating outwards along the vessels and nerve-fibres. In course of time the disc is itself invaded by the spots and hæmorrhages. Some suppose that the white spots always result from changes in blood-clots, but probably most of them are the result of independent exudation. Ultimately these may be absorbed, many of the vessels being obliterated or removed, causing retinal anæmia, while it is then seen that the choroid has undergone marked changes, and that it presents yellow patches. Important structural changes are set up in the retina, choroid, and vitreous body. Both eyes are always involved, but not to the same degree.

These ocular changes are unquestionably found most frequently and distinctly in connection with the "granular contracted," kidney, but they have been also noticed in other forms. As to their immediate cause, they have been attributed to hypertrophy of the heart accompanying renal disease; to some constitutional condition attended with changes in the vessels generally; to alterations in the blood, viz., uræmia or deficiency of albumen; or to extension of disease along the optic nerve from the brain.

Having given this general outline of Bright's disease, the prominent characters of the several varieties will now be pointed out.

I. LARGE, WHITE, SMOOTH KIDNEY—CHRONIC DESQUAMATIVE OR TUBAL NEPHRITIS.

ETIOLOGY.—This form is most frequently a sequel of the acute disease. It may come on gradually from taking cold; repeated pregnancies; or in the course of phthisis. It is chiefly met with in comparatively young persons.

ANATOMICAL CHARACTERS.—The kidneys are enlarged and heavy, ırface being smooth and pale, but variegated with vessels; the : is readily separated and unaltered or somewhat opaque. A shows great thickening of the cortical substance, which is white owish-white and opaque, often also presenting numerous small spots or streaks, due to fatty degeneration—"granular fatty " (Johnson). The consistence is diminished. The pyramids their normal colour, and contrast markedly with the cortex, they are also affected to a less degree. Microscopic examina- veals enlargement of many of the tubes, which contain a great r of epithelium-particles, with exudation. The cells are always ltered, being swollen, clouded, more or less granular, frequently ıing fat or oil-globules, or being quite disintegrated, so that only ılar *débris* remains, with masses of fat and oil-globules. Some ; may be quite denuded and empty, or only present hyaline ıs moulds. The Malpighian corpuscles are either normal in size tle enlarged, and their capsules are thin.

ery chronic cases this form of kidney occasionally gradually :ts and wastes, and it may become markedly small, owing to gration and absorption of portions of the cortical substance. psule is then more or less thickened, opaque, and adherent at superficial depressions form, causing a somewhat granular ap- :e; while there is some increase in the interstitial tissue, with ıing of the blood-vessels.

HOLOGY.—The generally accepted view of the pathology of the hite kidney is, that it is the result of *chronic tubular nephritis*, :d with great increase and desquamation of the epithelium, the f which gradually undergo changes, ending in their complete ansformation and destruction. More or less loss of tissue with y may follow in course of time.

PTOMS.—Either remaining after an acute attack, as frequently ıs, or being chronic from the outset, this variety has the following l features:—The urine is usually deficient in quantity; pale and omewhat turbid, depositing a whitish sediment, or from time to eing smoky or tinged with blood; of normal or rather high : gravity; and it contains a considerable quantity of albumen, as various casts, with renal epithelium or its remains. The micro- elements are not nearly so abundant as in the acute disease; by ıg their prevailing characters much information may be gained as exact state of the kidneys. The chief casts met with are *al*, the epithelium cells being always more or less altered; *ır; large or small hyaline;* and *fatty*, as the renal structures o fatty changes. Anasarca is generally a prominent symptom, rous effusions. The general surface, especially the face, presents aracteristic dull-white, puffy and pasty aspect, being often also ı and glossy, these appearances being more marked as fatty ration proceeds. There is considerable tendency to uræmia and inflammations. Dr. Johnson states that mucous hæmorrhages]uent in the advanced stages, especially epistaxis. Exacerbations y liable to arise from time to time.

2. GRANULAR CONTRACTED, OR CIRRHOTIC KIDNEY.—CHRONIC INTERSTITIAL NEPHRITIS.

ETIOLOGY.—In this variety the onset is always very chronic and insidious, without any obvious exciting cause. The contracted kidney is chiefly associated with gout; chronic lead-poisoning; chronic alcoholism; a tendency to general degenerative changes; or, it is said, repeated exposure to cold. The subjects of this form of renal disease are usually advanced in years.

ANATOMICAL CHARACTERS.—The prominent changes in the cirrhotic kidney are gradual contraction and atrophy, until the organ may weigh only an ounce or two; granulation of the surface, the granules ranging from the size of a pin's head to that of a pea or more, there being also irregular depressions, giving rise to a lobular appearance; thickening, opacity, and adhesion of the capsule, which is inseparable and sinks into the depressions; increased resistance and toughness of the renal tissue. These changes are advanced to very different degrees in different cases. On section it is seen that the cortical substance is chiefly wasted, having in some instances almost completely disappeared, what remains being of a red or brownish-red colour and coarsely-granular. There may be signs of fatty degeneration. Cysts are frequently observed, varying in size from very minute points to spaces as large as a nut or larger, and containing an albuminous fluid. In the gouty kidney a white deposit of urates forms within the tubules.

The intimate changes consist in a great increase of the intertubular fibrous tissue; with consequent alterations in the tubules, Malpighian corpuscles, and vessels. Many of the tubules are denuded of their epithelium, contracted, or obliterated; others are blocked up with disintegrated epithelium-cells; while still others contain clear fibrinous moulds. Fat-granules and oil-globules are often visible. The Malpighian bodies appear shrunken and abnormally close together, their enclosed glomeruli being more or less compressed by fibrous tissue. Many vessels are obliterated and the walls of the smaller arteries are thickened, hence it is difficult to inject the kidney through its main artery. The cysts so frequently seen are probably due to obstruction or constriction of the ducts at intervals, with distension of the intervening portions.

PATHOLOGY.—It is in connection with the cirrhotic kidney that important differences of opinion have arisen as regards pathological questions. With respect to its nature and mode of origin, German authorities consider it as being merely a later stage of the large white kidney, which, if it only lasts long enough, will become atrophied and granular, and some of their pathologists describe several stages in the progress of the morbid alterations in the kidneys. Though recognising the fact that now and then the large kidney does waste and become granular, yet most English writers are of opinion that the true cirrhotic kidney does not so originate, but that it is the result of chronic interstitial nephritis attended with proliferation of the intertubular connective tissue, which becomes much increased and compresses surrounding structures. Dr. George Johnson, however, considers that the epithelial cells are first affected, undergoing degeneration from having to perform nusual excretory work. Dr. Dickinson believes that the disease begins perficially immediately under the capsule, and gradually extends wards.

Before alluding to a view more recently advanced, it will be conenient to consider more particularly the morbid conditions of the heart d arteries which may be induced by Bright's disease, and which are und with special frequency associated with the contracted kidney. It ust be borne in mind that the heart may be primarily diseased, and y inducing mechanical congestion may lead to organic changes in the idneys ending in contraction and atrophy, this condition being, as reviously stated, regarded by some pathologists as a variety of Bright's isease. Again, affections of the cardiac valves may co-exist with nal disease independently, or as the result of the same constitutional yscrasia; or they may be the consequence of endocarditis complicating right's disease. It is, however, to cardiac hypertrophy, especially nvolving the left ventricle, and presumed to be a secondary result of e renal disease, that it becomes requisite to draw particular attention. here can be no doubt but that this condition of the heart does arise many cases of chronic Bright's disease, and the question is, how is it riginated? Formerly it was attributed to the altered state of the blood, hich was supposed to exercise an undue stimulation upon the heart, r to pass with difficulty through the capillaries, thus causing the heart act with excessive vigour and so to become hypertrophied. Traube vanced the opinion that destruction of the renal secreting tissue and struction to the circulation in the kidney lead to the hypertrophy, iefly because under such circumstances a sufficient amount of water not removed from the blood, and thus the arterial tension is increased. r. George Johnson made the important discovery that the walls of e small arteries, not only in the kidneys, but also in various other uctures throughout the body, are greatly thickened; he believes that s thickening is due to hypertrophy of the muscular coat, which is e consequence of the arteries opposing the passage into the tissues of e unhealthy blood associated with Bright's disease. Owing to this pertrophy the walls of the heart become also hypertrophied, in order overcome the resistance thus offered.

Still more recently Sir W. Gull and Dr. Sutton have denied that the ickening of the small arteries is due to muscular hypertrophy; they firm from their observations that these and the capillaries throughout e body become the seat of a peculiar *hyalin-fibroid* change, which ads to thickening of their walls with loss of elasticity, and they attrite the cardiac hypertrophy to this *arterio-capillary fibrosis*, as it is rmed. On these observations they found another view as to the thology of the granular kidney, viz., that it is but a part of a general orbid condition, beginning in the smaller vessels and affecting these roughout the body, which leads to atrophy of the tissues. In their inion the vascular changes outside the kidneys are not the secondary sult of the renal disease, but merely a part of the general disorder. he whole question is still in a state of great uncertainty.

SYMPTOMS.—The contracted kidney may be clinically latent for a ry long period. As regards the urine, this is as a rule abundant, ing in some cases *very copious*; of light colour and low specific gravity; while it contains comparatively little albumen, or even none at all at times; there being also but few or no casts, which are chiefly *hyaline* and *granular*, with but little epithelium or fat. At the close the urine often becomes very scanty or suppressed. Dropsy is absent in a considerable number of cases from first to last, and generally is but slight or only observed at intervals. The skin is dry and harsh, but does not exhibit the pale pasty aspect, and the face has often a sallow pinched appearance. In most cases there is marked debility and constitutional cachexia. Dyspeptic disturbances are frequently very prominent. The complications most liable to be met with are cardiac hypertrophy and morbid conditions of the vessels, the latter not uncommonly leading to apoplexy. Uræmia, serous, and pulmonary inflammations are much less frequent than in connection with the large white kidney.

3. Fatty kidney.

Fatty changes are observed in connection with all forms of Bright's disease, but some authorities are of opinion that the kidney may become primarily the seat of a *fatty infiltration*, the renal cells being loaded with fat, the liver being in most cases affected at the same time. Dr. Johnson applies the terms *simple fat kidney* or *general fatty infiltration of the kidney* to this condition. It is stated to be associated with any of the usual causes of fatty infiltration. The kidneys are frequently enlarged, their cortical substance being uniformly pale or mottled with red, and occasionally hæmorrhagic spots are observed. The consistence is diminished, the kidney having often an œdematous feel and appearance. The microscope shows uniform distension of the renal cells with oil. There may be albuminuria and other symptoms of renal disease, but generally no obvious signs of functional derangement of the kidneys are observed (Johnson).

4. Lardaceous or Albuminoid kidney.

Most writers now classify the lardaceous kidney as a form of Bright's disease. Its etiology and pathology are those of the general disease. The affected organs are usually enlarged, and their surface is smooth, the capsule separating readily. The consistence is very tough and hard. A section is sharp-cut, and shows the cortical substance pale, anæmic, waxy, and translucent, often dotted over with glistening spots, which correspond to the infiltrated Malpighian bodies, in which the deposit first occurs. The cones seem natural. The usual chemical reactions of albuminoid material are yielded. The renal cells are often cloudy, withered, or fatty, but they are stated not to afford the tests of albuminoid deposit. The intertubular tissue is generally increased. Transparent fibrinous moulds are found in some of the tubules. In advanced cases the kidneys may become much contracted and irregular.

Symptoms.—The local clinical signs which indicate implication of the kidneys in albuminoid disease, which have been mainly pointed out by Dr. Grainger Stewart, are as follows:—The urine becomes very copious at first, pale and watery, depositing scarcely any sediment, of low specific gravity, this varying from 1005 to 1012 or 1015. At this time albumen is either absent altogether or is present only in very small quantity.

it increases, often becoming exceedingly abundant, while the
nuch diminished in quantity, and its specific gravity consider-
d. In the early period casts are few in number, consisting
f small hyaline and finely-granular varieties. There may be
ithelial scales upon them; or these may be separate, being
rasted or containing oil-globules. Dr. Grainger Stewart states
epithelial particles occasionally yield the reaction of albuminoid
e. In the stage of contraction there may be considerable urinary
, in which are numerous large hyaline and granular casts.
s a common symptom, but in many instances it is probably to
extent due to the general constitutional condition. Uræmic
na are very rare.

5. Mixed types.

d only be remarked here that kidneys are sometimes met with
g combinations of the morbid changes described. Thus there
combination of the interstitial and tubal forms of disease; and
inson attributes the contraction of the latter in the later stages
vention of lardaceous disease in many cases; this may also
ny the large white kidney. As already remarked, fatty changes
non in all forms of Bright's disease.

Chapter LXI.

CERTAIN RARE DISEASES OF THE KIDNEYS.

I. Cancerous and other Growths.

occurrence, renal cancer may be primary or secondary. It is
quent in very young children or after adult age, and in males.
iety met with is almost invariably encephaloid. The deposit
s in the nodular form when secondary, but when primary it may
r nodular or infiltrated. Secondary cancer does not attain any
e, but primary cancer frequently grows to enormous dimensions,
giving rise to an irregular tumour. The consistence varies con-
y, being sometimes very soft and almost fluctuating, while it is
niform throughout. Hæmorrhage, softening, degeneration, and
tion are liable to occur in the growth. The uninvolved renal
is generally atrophied from pressure, or otherwise altered.
ing of the capsule and adhesions are generally observed;
djoining structures are frequently displaced or destroyed from
, the colon being always in front of the tumour. The pelvis of
ney and ureter are often involved. In the great majority of
nly one kidney is affected. Secondary deposits are common,
ly in the neighbouring glands.

TOMS.—The important clinical signs of renal cancer are severe
the lumbar region, generally shooting to the hypochondrium and

thigh or in other directions, and subject to remissions or intermissions; tenderness; hæmaturia, in many cases profuse and irregularly intermittent, and occurring without any obvious cause; and the presence of a renal tumour, the special characters of which are the rapidity of its growth and the great size which it may attain, especially in children; its absolute immobility; as a rule its irregularly lobular feel; and its more or less firm though unequal consistence. Occasionally there is an obscure sense of fluctuation in some parts. In some cases the superficial veins over it are much enlarged; and it has been known to present pulsation. Symptoms may arise from pressure of the tumour on surrounding structures. The detection of cancer-cells in the urine has been considered important, but several excellent observers doubt the possibility of recognising them. Marked emaciation and debility, with signs of the cancerous cachexia are frequently observed; and there may be evidences of cancer in other parts. The course of the disease is very rapid in children, but comparatively chronic in adults.

Of the *non-malignant* growths very exceptionally found in the kidneys may be mentioned osseous; fibrous or fibro-fatty; enchondromatous; lymphatic or glandular; and syphilitic gummata. Some of these may form an evident tumour.

II. TUBERCLE.

There are three classes of cases in which tubercle is found in connection with the renal apparatus, viz.:—1. As a part of acute miliary tuberculosis, the kidneys being studded with grey granulations. 2. Secondarily to tubercular disease in the lungs or other organs, when it does not usually give rise to any local symptoms. 3. As a primary deposit, generally involving the kidneys, their pelves and ureters, the bladder, and sometimes the urethra, being not uncommonly followed in the male by deposits in the prostate gland, testes, or vesiculæ seminales. The last is much the most important group. In the kidneys tubercle is seen at first as grey or yellow nodules in the cortex, which unite, become caseous and break down, forming irregular abscess-like cavities, which burst into the urinary passages, discharging disintegrated tuberculous matter and pus. Generally both kidneys are implicated, and they are frequently extensively or completely destroyed. In the pelvis and ureters the growth starts in the submucous tissue, where it forms granules, and ultimately inflammation of the overlying membrane is excited, ending often in extensive ulceration and destruction. Occasionally one ureter becomes completely rigid and its canal is blocked up, leading to pyonephrosis.

SYMPTOMS.—During the early period primary renal tuberculosis may be indicated by a dull pain in the region of the kidneys, with frequent micturition. The important symptoms, however, are those of chronic pyelitis or pyonephrosis, and often cystitis as well; great wasting, debility, and hectic fever; and in time implication of the lungs, intestines, or other organs. The urine is almost always deficient; slightly acid; and contains an abundance of pus, frequently a little blood, but not in any large quantity, extra-renal epithelium-cells, much granular detritus and in some cases connective-tissue or elastic fibres. If the ureter is blocked up, a painful fluctuating tumour forms in the corresponding rena ion, which may subside with coincident appearance of much pus in urine should the obstruction be removed. Uræmia is liable to e if both kidneys are affected.

III. Parasitic Growths.

Occasionally one kidney, especially the left, is the seat of a *hydatid our*, which may ultimately attain a great size. It tends to burst into renal passages, its contents escaping with the urine ; very rarely it s in some other direction ; or it may undergo any of the changes to h hydatid cysts are liable.

MPTOMS.—There may be none throughout. The most prominent of renal hydatid disease is the existence of a tumour, rounded in , though often somewhat irregular and lobulated ; having an elastic more or less fluctuating feel ; and occasionally yielding hydatid-itus. As a rule there are no renal symptoms. Should the cyst t into the urinary passages, important symptoms generally arise, those of one or, more commonly, several intermittent attacks of *itic colic*, due to the escape of the vesicles by the ureters ; preceded sharp pain in the renal region and occasionally a sense of some-g having burst ; and followed by signs of the passage of the hydatids g the urethra, *i.e.*, great pain to the end of the penis and constant e to pass urine, with more or less retention ; and finally by the arance of the vesicles or their remains in the urine, frequently along some blood or pus. Occasionally a cyst blocks up the ureter and to hydronephrosis. Inflammatory symptoms arise should the ur become inflamed ; or various symptoms may occur from its ng in different directions.

The *cysticercus cellulosus* has been found in the kidneys.

The following entozoa are met with occasionally :—*a. Bilharzia hæ-is.* This worm is found in some other parts, but it is most injurious nection with the bladder, ureter and pelvis, being deposited in the e veins of their mucous membrane. It belongs to the *trematoda*, about 3 or 4 lines long, of soft texture, and bisexual. The morbid it may produce are hæmaturia, it being, as previously stated, con-d the cause of the endemic hæmaturia of certain hot countries ; the ion of raised, injected, and ecchymotic patches in the mucous ane ; local inflammation ending in suppuration ; obstruction of eters, with consequent hydronephrosis or pyonephrosis ; and the ion of calculi, owing to the masses of ova forming a nucleus for y deposits.—*b. Strongylus gigans.* This is a *nematoid* worm, bling in general characters the ascaris lumbricoides, but being larger, having a reddish colour, and presenting six nodular papillæ the mouth. It is found in the kidney and urinary passages, and rily tends to give rise to considerable disturbance, but of no defi-haracter. *c. Pentastoma denticulatum.* Supposed to be the larva orm, this appears as a very minute encysted parasite, 1½ line long, haped, with a double pair of hooks, and devoid of sexual organs.

IV. Cystic Disease.

W. Roberts describes the following varieties of cysts in connection the kidney :—1. *Scattered cysts in kidneys* otherwise healthy, which

now and then attain a great size, so as to form a fluctuatir
2. Disseminated cysts in the atrophic form of Bright's disease.
genital cystic degeneration. 4. General cystic degeneratior
The last affects both organs, but to different degrees. They
enlarged, and converted into a mass of closely aggregated b
cysts, lodged in an abundant matrix of connective tissue, var
in size, and containing either a limpid yellowish or reddish s
gelatinous substance, this yielding albumen but not urinary in
subsequently other materials are often added. The renal tis
tially or almost completely destroyed. The cysts do not as a
into the pelvis, which, with the ureter and bladder, is usu
healthy. As to the origin of these cysts, they have been att
dilatation of the Malpighian capsules; or to distension of
the tubules which have been obstructed at each end. Duri
condition may give rise to a tumour, which is sometimes
large. The urine is occasionally increased in quantity, and g
low specific gravity. The termination is often by uræmic syn

V. Hydronephrosis—Dropsy of the Kidney.

This condition is the consequence of any permanent clos
ureter. It is frequently congenital, but may arise subsequ
impaction of a calculus or other body; organic changes i
leading to stricture, such as ulceration with cicatrization;
pressure by a tumour. As the result of this obstruction the
portion of the ureter above the impediment become dilated fro
lation of urine; this subsequently causes flattening of the p
gradual compression and atrophy of the pyramids of the kidne
by wasting of the cortex, with distension of the capsule, until
nothing may be left but a membranous sac containing fluid, ei
or divided into chambers, sometimes attaining an enormous si
fluid consists usually of altered urine, but much more water
normal secretion; almost always a little albuminous; and
presenting blood, pus, or epithelium. As a rule only one
affected, while the healthy organ becomes hypertrophied.

Symptoms.—Evidence of some cause likely to give rise to o
of the ureter may help in recognising hydronephrosis. The onl
sign, however, is the development of a painless, soft, more o
tuating renal tumour, which sometimes feels lobulated; unacc
by any unusual characters of the urine. Occasionally the obst
removed, and the tumour suddenly subsides with copious dis
urine, which is highly characteristic; the sac may afterwards s
It may be necessary for diagnosis to use an exploratory troch
aspirateur. The tumour may occasion symptoms by pressin
surrounding structures. It is curious that in double hydro
uræmic symptoms do not arise for a considerable time. M
ultimately terminate fatally in various ways. Extremely rarely
sac rupture spontaneously.

CHAPTER LXII.

URINARY CALCULUS AND GRAVEL.

consideration of this subject comes more appropriately within
e of surgical works, and here it is only intended to give a brief
f its main facts. By *gravel* is meant very small concretions,
e often passed in the urine in large numbers.

TIES OF URINARY CALCULI AND THEIR CHARACTERS.—1. *Uric*
his is very common both in the form of calculi and gravel,
ecially associated with the gouty diathesis, and hence occurring
i elderly persons and among those of the upper classes. The
ns are formed in very acid, high-coloured, concentrated urine.
hard; heavy; minutely tubercular or smooth on the surface;
oval and compressed; as a rule small or of moderate size;
usly coloured by urinary pigments. There may be several.
r, chiefly consisting of urate of ammonia. These form soft
concretions, deposited from acid urine, almost always in the
and nearly limited to young children. They are soluble in
r. 3. *Oxalate of lime or Mulberry calculus.*—This is cha-
l by the surface being rough and tuberculated like a mulberry.
oderate size; generally spherical; very hard; and dark brown
black. 4. *Phosphatic calculi.*—The important variety is the
culus, consisting of mixed calcic and ammonio-magnesic phos-
It is almost always formed in the bladder, and on a nucleus of
er material. There is no limit to the size which may be at-
The texture is loose and friable, easily breaking down, and
g a chalky or earthy appearance. Crystals of triple phosphate
d the surface. By heating with the blowpipe, this calculus
o an enamel-like material. Another rare variety is the *basic*
of lime or *bone-earth calculus*, which is very white; chalky-
and soft. Among the exceptional urinary calculi are:—
nate of lime. 6. *Cystine*, usually ovate; yellow, but changing
reen on long exposure to light; lustrous; mammillated on the
friable and soft. 7. *Xanthine.* 8. *Fatty or saponaceous con-*
9. *Fibrinous and blood concretions.* 10. *Alternating*, consist-
ternate layers of two or more primary deposits.

LOGY.—Most of the calculi mentioned are of renal origin, being
from a deposit from the urine as it is first excreted, within the
of the kidney, pelvis, or infundibula. Such are termed *primary*
nd the theories as to the cause of their formation are:—1.
sence of excess of certain normal ingredients in the urine (uric
lates, &c.); or of some sparingly-soluble abnormal ingredient
xanthine). 2. Certain conditions of the urine diminishing its
power over some of its constituents, *e.g.*, excessive acidity or
y of chloride of sodium and alkaline phosphates diminishing
ility of uric acid and urates; alkalinity from fixed alkali leading
osit of bone-earth phosphate or carbonate of lime. 3. The
of some body *suitable to form* a nucleus for deposits. The

mixed phosphatic calculus is al
results from decomposition of
this condition being, as already
of earthy phosphates, which
ammonia and carbonate of lim
calculus, and the deposit always
generally a calculus which has
retained in the renal pelvis a
calculus may form there. In
sists of a *central nucleus*, surro
may be a phosphatic *crust*. T
same composition as the rest o
of some foreign body, or of mu
a stratified arrangement, but
Blended into the structure of
matter, including mucus, epi
morbid effects liable to be ex
rhage, from direct injury t
2. Renal congestion, or infla
or pyonephrosis. 4. Hydrone
impaction in the ureter. 5.
lodged in cysts or pouches, an
sometimes happens that one
lodges in the pervious one, le
with uræmia. Very rarely a
apparatus into other parts, suc

SYMPTOMS.—The clinical s
consequences of the effects ab
here. It is only requisite to p
a stone lodged in the kidney o
teristic of its passage along the

The symptoms of *calculus in*
of a dull aching character, a
and thighs; pain at the end
the presence in the urine of bl
infundibulum, or unorganised
These phenomena are usually a
position of the calculus, especi
the symptoms often assume th
typical form being due to the pa
bladder. It is characterised
region, shooting in various dir
gastrium, testis, end of the pen
ness, the patient tossing about
constant desire to micturate, t
suppressed, what is passed bei
charged in drops with much h
collapse and faintness, with
pulse; generally distressing na
sometimes spasm of the muscl
lasts a variable time, there bei

calculus reaches the bladder, the symptoms usually subside with suddenness, affording a sense of intense relief, and the patient e conscious of something having fallen into the bladder. If the lasts for some time, more or less pyrexia is liable to be set up.

CHAPTER LXIII.

CYSTITIS—VESICAL CATARRH.

ses of the bladder are mainly surgical, but it is necessary to allude titis, as this complaint is not uncommon in medical practice.

OLOGY.—The causes of vesical catarrh are :—1. Direct irritation, ally by calculi and morbid growths; or from certain conditions of ine, as after taking excess of cantharides, copaiba, beer or spirits, rticularly when it becomes ammoniacal as the result of retention ome impediment to its escape, or from paralysis in spinal disease. ension of inflammation in the vicinity, especially that of gonor- 3. Exposure to cold or wet. 4. Acute exanthemata occa- y.

TOMICAL CHARACTERS.—Acute cystitis is characterised by red- elling, and softening of the mucous membrane; with formation of of mucus and detachment of epithelium with numerous young cells. chronic form the colour becomes often dirty grey or brown; and s thickening of the tissues, with, in time, hypertrophy of the ar coat, the walls becoming much thicker and tough. Abundant urulent or purulent matter forms in the bladder, and the surface cerate or even become gangrenous, or suppuration between the nay take place, ending in extensive destruction and structural s. The urine is generally decomposed and ammoniacal. This en supposed to be the result in some cases of an alkaline fer- ion set up by the mucus formed in the bladder. Niemeyer and however, have advanced the opinion that this decomposition is lly the consequence of the repeated use of dirty catheters, by low vital organisms are introduced into the bladder.

PTOMS.—The prominent symptoms of acute cystitis are uneasi- nd a sense of heat over the bladder, in the perinæum, and along ethra; in some cases tenderness in the hypogastrium; constant ation to micturate, a few drops of urine being passed, causing pain and a sense of burning; and the presence of more or less in the urine. There may be some pyrexia. The chief indication nic cystitis is derived from the character of the urine, which con- nuch mucus and epithelium or pus, or sometimes blood, and if ine is ammoniacal the pus is converted into a gelatinous, ropy, ve substance, which is poured with difficulty from one vessel into r, and may be drawn out into strings. After a while there is nuch constitutional disturbance, with a tendency to hectic fever; extensive suppuration or gangrene should be set up, low typhoid ms are liable to arise, or those indicative of peritonitis.

some of the causes of these complaints ; the symp
to the urinary organs, and their nature ; the resul
tion, especially as regards the characters of the u
remote symptoms due to the renal disorder, p
uræmic phenomena ; and the general or constitut
may be arranged under certain groups.

1. ACUTE RENAL INFLAMMATORY AFFECTIONS.
Bright's disease ; *suppurative nephritis* ; *pyelitis* ; a
there is generally much pain referred to the ki
disturbance of these organs, and pyrexia, but t
distinguished by the circumstances under wh
characters of the urine ; and, as regards Bright's
and other characteristic symptoms which accomp
presence in the urine of epithelium from the pe
highly important, while later on pus appears.
may give rise to physical signs of an abscess
Perinephritis is, as a rule but not invariably,
absence of any morbid characters of the urin
might possibly be mistaken at first for some of t
tions, but the milder character of the symptoms
dence sufficiently characterise this condition. A
simulates renal inflammation.

2. CHRONIC BRIGHT'S DISEASE.—The varieti
disease constitute an important group of renal affe
of one or other form of this disease is often quite e
and existing symptoms, especially the character
minuria may be the only sign, and therefore it is
a routine practice of examining the urine, especi
persistently out of health without any obvious cau
from dyspeptic symptoms or headache. Of cou
bered that albuminuria may be due to other

it is very important to determine whether such is the case or not by a consideration of the previous history, the presence or absence of any evident cause of the acute attack, and the characters of the urine; if much blood and renal epithelium should be discharged, and if the microscopic elements do not show signs of degenerative changes, the disease is probably recent and acute. The development of an acute inflammatory affection or of uræmic symptoms in the course of chronic Bright's disease not previously known to exist may prove very puzzling. The rule of always examining the urine will generally lead to the detection of the renal affection.

3. Hæmaturia—Pyuria.—In certain urinary affections the prominent symptom is the discharge of *blood* or *pus* in the urine. Some of the points to be noticed in making out the source and pathological cause of these admixtures have already been considered, but in addition the following are important, viz.:—The history and previous symptoms as revealing some cause, such as calculus or stricture; the seat of local symptoms, whether pointing to the kidney, bladder, or urethra; the characters of the urine, with the amount of the abnormal ingredient, its mode of admixture and exact appearances, the manner in which it is discharged, and the other microscopic elements with which it is mixed; the results of thorough physical examination; and the general symptoms present. With regard to pyuria, one of the chief difficulties is to determine whether it results from pyelitis or chronic inflammation of the bladder and lower passages, especially when these conditions are associated. The presence of epithelium from the pelvis and infundibula is very important at an early period in revealing pyelitis, but it disappears in time; if the complaint exists alone, however, the local symptoms and discharge of acid urine containing much pus, especially if with a history of some obvious cause, are sufficiently distinctive. When pus comes from the bladder, it is frequently ropy and tenacious, on account of ammoniacal urine being discharged mainly towards the end of the act of micturition. When disease of the lower passages and bladder has been in existence for a length of time, it is highly probable that the kidneys are also involved. When pus originates in urethral inflammation, there are the local signs of this condition, while pus escapes before the urine, and can be pressed out independently. In doubtful cases of leucorrhœa it has been recommended to pass a catheter and thus remove some of the urine directly from the bladder for examination.

4. Renal Tumour.—Occasionally the chief matter in diagnosis is to determine the nature of a *tumour in the renal region.* This may be due to *renal abscess; pyonephrosis; hydronephrosis; cancer* or a *non-malignant growth; hydatid disease; cystic degeneration of the kidney;* or *perinephritis.* The distinctive features of these have been sufficiently pointed out in their description, the characters of the enlargement and of the urine being important elements in diagnosis. It may be requisite to employ an exploratory trochar or the aspirateur. The tumour may become so large as to fill the abdomen, so that it becomes impossible, except by the history, to recognise its origin; and when due to accumulation of fluid it may simulate ascites. A renal tumour may be mistaken for one in connection with the ovary, uterus, supra-renal capsule, liver, spleen, or neighbouring glands; or for an accumulation in the intestines.

passage of a gall-stone; severe neuralgia; or intesti

II. Prognosis.

Any organic disease of the kidneys is serious, esp sive and if both organs are involved. Of the acut disease demands the first consideration. A large affected with this complaint recover completely, b into the chronic state, and therefore it is necessary carefully for some time before giving a final progn the subsidence of the symptoms, the albumen a urinary ingredients steadily diminish, and the urine i to its normal characters and composition, the prog Even should slight albuminuria hold on for some with a few casts, the case may end in ultimate rec continues to be discharged in abundance for a prognosis becomes more serious; much will depen sence and characters of the casts, whether these sho subsiding, or that it is becoming confirmed, with de in and destruction of the epithelium. Recovery ca satisfactory until every trace of albumen has disapp diate prognosis is more grave if the urine becom contains a large quantity of albumen, blood, and signs of immediate danger are uræmic symptom glottis and lungs, or abundant pleuritic or pericardi erysipelas affecting dropsical parts; and the dev inflammatory complications.

Suppurative inflammatory diseases in connection very dangerous, on account of the interference wit tion; the constitutional disturbance; and the dange purulent accumulation. Pyelitis differs much in its its duration; its cause; and whether it is single or d and even enjoy comparatively good health. The circumstances which render the prognosis more unfavourable are a long duration of the disease; steady diminution in the quantity of the urine, without corresponding increase in density; excessive albuminuria, with abundant granular and fatty casts or oil-globules; extensive dropsy, with serous effusions; obstinate dryness of the skin; marked cardiac hypertrophy and vascular changes; persistent dyspepsia or disturbances of the bowels; and constant pyrexia. It is wonderful, however, how much improvement in symptoms may be brought about in some apparently hopeless cases. There is always a danger at any moment of the supervention of uræmia; acute exacerbations of the kidney disease; or inflammatory complications, the last being very easily set up and being much more grave than in healthy persons. Patients suffering from Bright's disease are extremely unfavourable subjects for injuries or operations.

It is unnecessary to allude particularly to the prognosis of the rarer forms of renal disease. With regard to calculus, there are a good many dangers attending it; it may produce extensive disorganisation of the kidney; or its passage to the bladder may prove fatal. If the stone is very large, or if there are several, the prognosis is more grave. Calculus is a disease liable to recur.

III. TREATMENT.

1. ACUTE INFLAMMATORY AFFECTIONS.—The general measures applicable at the outset in all forms of acute renal inflammation are to keep the patient in bed, completely at rest; to cup over the loins to the extent of from 6 to 10 or 12 ounces, if the case is favourable, or otherwise to dry cup freely; to apply hot poultices or fomentations constantly across this region; to give low diet, with abundance of diluent drinks; and to act freely upon the bowels. In suppurative nephritis, should there be signs of an abscess, this should be encouraged to the surface, and opened when the proper time arrives. At this time abundant support with stimulants may be required, especially if typhoid symptoms should set in. In pyelitis it is very important to remove the cause, if possible; and when the complaint is due to a calculus, a considerable amount of opium or subcutaneous injection of morphia is often needed in order to relieve the pain.

The treatment of acute Bright's disease calls for special consideration. Removal of blood requires particular caution in this affection, on account of the tendency to anæmia, and it should be omitted if the patient is weak, and especially if chronic renal disease has previously existed. The most important object in treatment is to endeavour to get the skin to act freely and persistently. This is best effected by making the patient wear flannel; lie between blankets, avoiding every source of draught; and make use of warm, hot-air, or vapour baths, repeated daily or less frequently as circumstances indicate. Dr. W. Roberts recommends the warm "blanket-bath." Internally full doses of citrate or acetate of potash or liquor ammoniæ acetatis may be given, freely diluted, with a few minims of tincture of henbane; some authorities highly recommend small doses of tartar emetic or antimonial required if the dropsy does not subside.

Various symptoms frequently call for atten
acute Bright's disease, especially vomiting a
The management of inflammatory complica
within the chest, is often a matter of much di
ment is decidedly not admissible, and on no
given, as in renal diseases the smallest dose
serious salivation. Blistering and application o
care, as they tend to irritate the kidneys. Opi
or only given very cautiously. Free dry cu
fomentations or poultices; and chloroform ep
applications.

After the more acute symptoms have su
diuretic, and purgative remedies must be mo
the most valuable medicine is iron. Care is
with this drug, which should be given at fir
small doses, its effects being carefully watche
sesquichloride, syrup of phosphate, ammonio-ci
are the best preparations, and if the first is
excellent results are frequently brought about
bined with the iron, and this remedy is partic
scarlatina. The diet should be gradually im
tritious and digestible, and during convalesc
given provided it agrees. The greatest care is
guard against a relapse. The patient should al
the body, and avoid every possible exposure; in
to enforce confinement to the bedroom until
diappeared, and for some time special precau
wards a change of air to a warm region and c
is very beneficial; or this may be recommende
become chronic.

it must be completely clad in flannel; avoid exposure, especially
l or wet; and take moderate exercise daily. If possible a resi-
in a tolerably warm, equable, and sheltered district is advisable,
emporary change to such a district should be recommended. A
oyage is sometimes highly beneficial in cases not far advanced.
ery necessary to keep up a free action of the skin by means of
and other baths with friction. The diet requires supervision and
d be of a nutritious and digestible kind. Milk may be usually
in large quantities. Skimmed-milk has been specially recom-
ed in the treatment of Bright's disease. Strong stimulants are
avoided, but light wines or a glass of good bitter ale often do
The bowels must be kept well-opened daily, and the digestive
ons maintained in good order. *c.* Treatment directed to the con-
onal state and to the condition of the blood is of the highest
The administration of iron, regularly and perseveringly carried
ften produces the most beneficial results in the way of improving
ate of the blood and general system. If it can be taken, the tinc-
of steel or the solution of pernitrate is the best form, but the
arated carbonate, ferrum redactum, syrup of iodide or phosphate,
nio-citrate, or citrate of iron and quinine, are also very useful.
g other constitutional conditions requiring special attention are
sis; albuminoid disease; gout; and saturnism. *d.* Some autho-
consider it desirable to diminish the amount of albumen dis-
ed, by means of tannic or gallic acid, mineral acids, alum, or
of potassium. It is very questionable whether any of these are
ious for this purpose. *e.* Dropsy is the chief symptom calling
terference in a large proportion of cases of Bright's disease. Pur-
s and baths are the important remedies. Among the former
cream of tartar, elaterium, scammony, gamboge, and podophyllin,
e most serviceable. Some give liquor ammoniæ acetatis freely
ron, to act as a diaphoretic; others recommend James's or Dover's
er. Opinions are much divided with regard to diuretics, both as
e propriety of giving them, and as to those which are most effi-
s. In my experience certainly they are not of much use as a
and they may do considerable harm. In extreme dropsy puncture
ision of the skin of the legs or scrotum may be required. Great care
essary when carrying out this measure, in order to guard against
elas, by applying warm moist flannels, frequently changed and
ghly cleansed before being re-applied; and by sponging the parts
efore each application is made: some practitioners employ anti-
washes. Particular care is also needed against pressure or irrita-
y urine. *f.* Among other symptoms which are likely to require
ent are those indicative of dyspepsia; vomiting; derangement of
owels; headache; and uræmic phenomena. The remarks made
acute Bright's disease as to inflammatory complications apply also
chronic affections. *g.* It is necessary to warn patients against
ngers to which they are exposed, and impress upon them the ne-
of paying strict attention to the hygienic matters already men-
Should cardiac hypertrophy be set up, with changes in the
s, the danger of the occurrence of cerebral hæmorrhage should be
in mind.

3. Purulent discharge in the urine.—Should this symptom require special treatment, the principles are :—*a*. To remove any obvious cause of the suppuration, if possible. *b*. To administer remedies to check the formation of pus, the chief being alum; astringent preparations of iron; mineral acids; tannic or gallic acid; vegetable astringents, particularly decoction of uva ursi or buchu; metallic astringents in obstinate cases; balsams and resins, especially balsam copaibæ and turpentine. If the bladder is affected, injections of warm water are useful, or even astringent injections carefully employed. *c*. To support the general health and treat the constitutional state by good diet, change of air, sea-bathing, tonics, and cod-liver oil.

4. Some conditions of the kidney occasionally need *operative interference*. In cases of pyonephrosis or abscess of the kidney it may be requisite to let out the pus. In hydronephrosis the first principle is to endeavour to remove the obstruction which causes the retention of urine, and frequent manipulation and shampooing over the renal region has sometimes been found effectual for this purpose. If this does not succeed, and there are indications of danger, tapping must be resorted to and repeated if necessary. Hydatid tumour must be treated in the manner described in connection with hydatid of the liver. The removal of the kidney for cancer or other solid tumour is scarcely permissible, but has been performed.

5. The treatment of *urinary calculus* is very important. In the first place measures should be taken to prevent its formation, if the urine gives indications that there is any danger of this; or if there has been a previous history of stone. The chief general measures requisite for this purpose are to make the patient drink water freely, so as to maintain the urine in a diluted state; not to allow too long intervals between meals, but to take four or five light meals during the day; and not to lie too much in the recumbent posture, the hours of sleep being moderate. Uric acid calculus is further guarded against by strict regulation of diet, which must be mainly farinaceous, all heavy meals with much meat and rich wines being avoided; and by administering moderate quantities of bicarbonate or citrate of potash. Oxalate of lime calculus is prevented by keeping the urine very dilute; maintaining the activity of the skin; avoiding certain vegetables rich in oxalates, especially rhubarb and sorrel, and also calcareous waters; and giving alkaline carbonates. Phosphatic calculus is obviated by careful attention to the bladder, if this organ is diseased; and by endeavouring to change the character of the urine; if it is ammoniacal, it may be desirable to wash out the bladder with dilute acids. It has been thought possible to dissolve calculi after their formation—those of uric acid in the kidneys by administering acetate or citrate of potash freely in frequently repeated doses; phosphate calculi by dilute acid injections into the bladder. For nephritic colic the remedies are free administration of opium by the mouth or rectum, or subcutaneous injection of morphia; belladonna, if opium is not admissible; warm baths, with fomentations or poultices over the loins; and the abundant use of warm demulcent drinks. It may be necessary to cup over the loins. Change of posture and manipulation along the ureter have been said to aid in the passage of a calculus. If the pain is extreme, it may be desirable to administer chloroform.

iting and collapse must be attended to. Surgical treatment is of e usually required when a stone reaches the bladder; and in rare ices it has been found necessary to remove a large calculus by tion from the pelvis of the kidney, but only if it has led to the tion of an abscess. The treatment of the pathological conditions ed by stone have already been sufficiently considered.

CHAPTER LXV.

DISEASES OF THE ABSORBENT GLANDS.

AL CHARACTERS.—The signs to be sought after as indicating morbid conditions bsorbent glands are :—1. Pain and tenderness in these structures, often with a of stiffness. 2. Enlargement, generally accompanied with changes in consis- This may be limited, or affect the glands extensively throughout the body, not nonly giving rise to considerable tumours. The superficial glands are either ; or tend to form nodular, irregular, firm masses, owing to a number of glands ggregated together; or chains of these may be involved. Those of the neck, and groin are most commonly affected. In the chest they may give rise to the l signs of mediastinal tumour. They can frequently be felt in the abdomen by steady deep pressure or grasping portions of the walls, either as separate or as a distinct tumour. The latter is deeply situated, nodular, and fixed, sually not very large. 3. Interference with the passage of lymph and chyle.— een supposed that obstruction to the passage of lymph may lead to its coagu- and to a kind of solid œdema. Interference with the progress of the chyle will affect the nutrition of the body, and thus induce emaciation. 4. Evidences of e upon, irritation, or destruction of neighbouring structures.—These will of vary with the situation of the enlarged glands. Neuralgic pains and localised are not unfrequently observed, owing to nerves and veins being interfered In the chest and abdomen more or less pressure signs may be present, as in the other tumours. By their irritation inflammation of serous membranes and other es may also be excited. The glands are liable to undergo destructive changes, may implicate neighbouring parts, causing serious mischief. For instance, they ppurate and destroy the cutaneous structures; or in the chest lead to destruction ions of the lungs or perforation of air-tubes or vessels; in the abdomen to per- peritonitis or perforation of the bowels. 5. Symptoms indicating some con- nal cachexia.—These are of much importance, necessarily differing in their cha- according to the nature of the disease.

SPECIAL DISEASES.

ACUTE CONGESTION AND INFLAMMATION—ADENITIS.—The ab- nt glands are very liable to become the seat of active congestion ute inflammation, especially from some neighbouring irritation yed along the absorbent vessels; certain infective poisons, *e.g.*, itic virus; or injury and straining. This may subside or proceed puration, or leave the glands chronically enlarged, especially if ritation is repeated several times. The early symptoms are pain, rness, stiffness, and swelling of the affected glands; which may be ed by signs of the formation of an abscess. There is frequently pyrexia. Chronic inflammation is set up in some cases, the s becoming gradually enlarged and hardened; they may subse- ly degenerate and become caseous or form abscesses.

2. SIMPLE HYPERTROPHY OR LYMPHADENOMA.—This is a very important morbid condition of the glands. As already stated, it occurs in one form of leucocythæmia, and it is the prominent anatomical character of what is known as *Hodgkin's disease*, which is presumed to be a constitutional affection, essentially characterised by hyperplasia of the absorbent glands more or less throughout the body; followed by increase of the lymphatic tissues in the spleen, liver, lungs, and various other structures. The glands often form considerable tumours, superficial or contained within internal cavities, of somewhat soft consistence. Microscopic examination shows that the enlargement is entirely due to hypertrophy of the gland tissue. Clinically, in addition to the symptoms associated with the enlarged glands, which are generally painless, there are usually signs of profound constitutional disturbance, which may precede the glandular hypertrophy, characterised by extreme anæmia, with its accompanying symptoms, and often an appearance of serious illness; marked muscular weakness, the patient frequently tottering and trembling; feeble circulation; and great emaciation. Œdema of the legs is common. There is no increase of white corpuscles in the blood. The course of the disease may be acute, attended with considerable fever and profuse perspirations, vomiting and purging, and mental wandering at times. On the other hand, the glands of the neck, axilla, and other parts may be extensively hypertrophied, and yet the system not be much affected, the patients enjoying very fair health.

3. SCROFULOUS OR TUBERCULAR DISEASE.—In scrofulous subjects, especially children, one of the prominent characters in many cases is chronic enlargement of the external glands, especially those of the neck, there being a subsequent tendency to degeneration and breaking down of their structure, with unhealthy suppuration. In other cases the glands within the abdomen and chest are extensively affected. The enlargement was formerly considered as being due to an unhealthy chronic inflammation; or to a deposit of tubercle. Now, however, it is known to be the result of hyperplasia of the lymphatic elements. These have a very low vitality and are liable to become speedily disorganised and caseous; they may finally dry up and calcify, or go on to unhealthy suppuration and burst or destroy neighbouring tissues. When the affected glands are superficial they are easily recognised. In the chest they constitute the disease named *bronchial phthisis*, and in addition to giving rise to the signs of a mediastinal tumour, the glands are liable to soften and form excavations, ultimately involving the lungs, or opening into the trachea or a bronchus, the pleura, or a great vessel. If they communicate with the air-passages, there is much expectoration of muco-purulent or purulent matter; as well as often of blood, caseous matter, and calcareous particles. When the mesenteric glands are implicated—*tabes mesenterica*—they may be felt separately or as a mass, and often give rise to symptoms of peritoneal irritation or inflammation; flatulence; colicky pains; and various digestive disturbances. Owing to the flatus the abdomen is generally much distended. Appetite may be excessive, deficient or lost, or capricious. The bowels are frequently irregular, either constipated or relaxed, the stools being unhealthy. In exceptional instances the softened glands have ruptured into the peritoneum or intestines. In this variety of gland disease there is usually con-

le constitutional disorder, indicated by emaciation, debility, and nding towards a hectic type. The loss of flesh is frequently ex- when the lacteal glands are involved; and it is also very marked chial phthisis if the glands break up. In children, in whom this int is much the most common, there is in many cases no evi- of tubercle in other organs; but in adults the lungs or other res are generally implicated. Recovery may be brought about when the glands throughout the body have been extensively l, many of them perhaps remaining as calcified masses.

ARDACEOUS DISEASE.—The glands are often the seat of albu- infiltration. They are then very firm and small, on section ing the characteristic pale, homogeneous, waxy appearance. In domen they can be felt as little hard masses, separate, and movable. The constitutional symptoms are those of the general

ANCER.—As a secondary deposit cancer is very liable to impli- e absorbent glands in the neighbourhood of any structures l with this disease. It may commence in them primarily. All re met with, and large, hard, nodulated tumours are often formed. inical phenomena are mainly those due to the tumour; with es of the cancerous cachexia. The glands are generally very and tender.

GENERAL DIAGNOSIS, PROGNOSIS, AND TREATMENT.

IAGNOSIS.—In forming a diagnosis of glandular diseases, special n must be paid to the constitutional condition; and to the l characters presented by the glands. The main difficulty lies rmining disease of the glands in internal cavities; and in making ir exact condition. Glandular disease must be always borne in s a prominent cause of wasting in children, especially affections mesenteric and bronchial glands.

PROGNOSIS.—This will depend on the nature and cause of the ; the state of the constitution; the situation and extent of the affected; and the changes which they undergo. In internal enlarged glands by their mere pressure or destructive effects le to give rise to serious mischief. Extensive glandular disease dren, particularly when the mesenteric glands are involved, is ngerous.

TREATMENT.—1. In acute adenitis the principles of treatment remove the cause; keep the affected part at rest; and use warm ations and poultices freely. Should suppuration be set up, this e managed on the usual principles. 2. In chronic affections itional treatment is of the first importance. This must depend nature of the disease, but the remedies generally serviceable are nutritious diet, with plenty of milk; attention to all hygienic , with change of air, especially to the sea-side, sea-bathing being very beneficial; regulation of the digestive functions; cod-liver nine, iron in some form, especially syrup of the iodide or phos- and other tonics. Iodide of potassium and liquor potassæ have upposed to influence the size of the glands. It is the custom to ious applications over enlarged glands with the view of diminishing their size, especially ointments of iodine or iodide of lead; tincture of iodine painted over the skin; lotions of iodine and iodide of potassium; spirit lotions or those of muriate of ammonia; or sea-weed poultices or fomentations. In many instances undoubtedly much good may thus be effected, but certainly it is necessary to be careful in employing strong applications, such as iodine; and in practising violent friction, as injurious irritation and inflammation may be thus induced. Gentle friction with some simple oleaginous substance is frequently beneficial. Should abscesses form, they must be treated by poulticing and incisions. Symptoms due to enlarged glands in internal cavities must be treated as they arise. Some practitioners recommend irritant injections into the substance of chronically enlarged glands. Extirpation has been occasionally practised, but this is not a desirable mode of treatment. The administration of phosphorus may diminish the size of the glands in Hodgkin's disease, but is for other reasons not to be recommended.

CHAPTER LXVI.

DISEASES OF THE THYROID GLAND—BRONCHOCELE—GOITRE.

THE cases of disease affecting the thyroid body which come under the notice of the physician belong to two distinct groups, which it will be necessary to notice separately.

1. In certain districts enlargement of the thyroid gland—*bronchocele* or *goitre*—is very prevalent, so as to become an endemic disease. It is particularly observed at the base of high mountains. In this country goitre prevails especially in Derbyshire—hence named "Derbyshire neck;" and in certain parts of Yorkshire, Sussex, Hants, and Nottinghamshire. It has been attributed to various meteorological and other causes, but the mass of evidence goes to prove distinctly that it is due to impregnation of the drinking water with excess of lime and magnesia salts, these having been dissolved in the percolation of the water through the geological strata containing them. The disease is observed most commonly in females, and is rare before puberty, though it has been known to be congenital.

ANATOMICAL CHARACTERS.—The degree of enlargement varies considerably, and the gland may attain very great dimensions. It begins in the isthmus or in one lobe, especially the right, but ultimately usually involves the entire organ. The shape is generally altered, the distinction of the several parts of the gland being lost, but not always. At first the tumour is soft, but gradually becomes firmer, and may ultimately be exceedingly hard. In the early stage there is simply hypertrophy of the gland—*simple bronchocele*—with formation of a glutinous, ropy, colloid fluid in its cells; afterwards the blood-vessels increase in number and become dilated, while numerous cysts form—*cystic bronchocele*—containing the gelatinous material or a bloody-looking fluid. Ultimately calcareous matter is deposited, and the gland may be converted into a calcified capsule, enclosing cysts, various kinds of fluid, calcareous gregations, &c. Inflammation and suppuration or ulceration are ble to arise, altering materially the characters of the enlargement.

SYMPTOMS.—The thyroid gland presents an obvious swelling. It y compress the neighbouring structures, and lead to serious dyspnœa, phagia, or interference with the circulation in the neck. The general tem is below par, there being often much debility and anæmia. In ne valley districts bronchocele is associated with *cretinism*, a condi- n indicated by marked mental deficiency, with atrophy of the brain; well as bodily deformity.

2. *Exophthalmic goitre—Graves's* or *Basedow's disease.*—This is a hly interesting complaint, characterised by palpitation of the heart: rked pulsation in the vessels of the neck and head; enlargement d usually pulsation of the thyroid gland; and prominence of the eye- ls or exophthalmos. It is observed by far most commonly in young men, but may be met with in males, who are usually somewhat vanced in age. Almost always, but not invariably, the condition is ociated in females with marked anæmia and menstrual derangement. thologically it is believed to be the result of paralysis of the vaso- tor nerves of the vessels of the heart, thyroid, and head and neck. e enlargement of the thyroid, which is not usually very great, is due dilatation of its vessels; serous infiltration of the tissues; and ertrophy; very rarely do cysts form. The exophthalmos results n the eyes being pushed forward, owing to increased vascularity, ema, and probably hyperplasia of the fat behind them. There is no lence in support of the notion that the nervous disturbance is due to obvious change in the cervical ganglia of the sympathetic, as has n suggested.

SYMPTOMS.—As a rule the subjects of this affection are very anæmic chlorotic. Palpitation has usually been noticed for some time before other phenomena, and these generally come on very gradually. e enlarged thyroid pulsates or presents a peculiar thrilly sensation, l frequently a hæmic murmur is heard over it. The pulsation may visible at a distance, and the carotids are often seen to throb lently. The degree of exophthalmos may become so great that the balls project considerably, so that the eyelids cannot cover them; ce grave destructive changes are liable to be set up in these organs. ir movements also may be much impaired. The exophthalmos is etimes preceded by a spasmodic contraction of the levatores palpe- um, said to be very characteristic. Uncomfortable sensations of bbing, giddiness, and headache are often complained of. Many s improve or recover under proper treatment. Death may result the consequences of gradual dilatation and weakening of the t.

REATMENT.—In simple bronchocele the principles of treatment are hange the residence; avoid drinking the impregnated water; em- iodine both internally and externally; and improve the condition he system by means of iron. Iodine has gained the reputation of g almost a specific, and the best mode of administration is to give tincture in small doses with iodide of potassium freely diluted. de of iron is also very useful. Externally applications of the tinc- iodine ointment, or ointment of iodide of mercury are chiefly employed. Pressure may be beneficial. If this treatment is unsuccessful, surgical interference is advocated, especially injection of the gland with some irritant, such as diluted iodine or tincture of steel; passage of a seton or wire through the tumour; ligature of the thyroid arteries; or finally extirpation of the enlarged organ.

For exophthalmic goitre the treatment is that of the general state, iron and other tonics, with nutritious digestible food, and careful attention to hygienic conditions, being the chief remedies required. Digitalis is useful, on account of its influence upon the heart; and belladonna has also been found efficacious in combination with iron. Ergot has been recommended, as well as galvanism of the sympathetic in the neck. Care must be taken to prevent the eyes from becoming injured, and with this object the eyelids may be closed by means of a light bandage if necessary.

CHAPTER LXVII.

DISEASES OF THE NERVOUS SYSTEM.

CLINICAL CHARACTERS.—The clinical investigation of nervous affections is frequently very difficult, and there is no class of diseases in which a definite and systematic mode of examination is more requisite. Further, it is highly important to remember the anatomy and physiology of the nervous system, particularly as to the functions of the different parts of the central organs, and the distribution and functions of the nerves. The clinical phenomena which may be associated with the nervous system are as follows :—

1. Morbid sensations in the head, including headache, tenderness, sense of weight or heaviness, throbbing, heat, vertigo or dizziness.

2. Morbid sensations connected with the spine, chiefly pain, tenderness, burning, and a peculiar sense of tightness round the body, as if it were encircled by a tight cord extending from the spine. As regards spinal pain, it is important to notice whether it is felt all along the spine or is localised ; if it is constant or paroxysmal ; if it shoots in any direction ; and in some cases how it is influenced by walking, movements of the spinal column, percussion or kneading along the spine, concussion of the heels, and the passage of ice or of a hot sponge along the spine.

3. *Mental disturbance.* It is impossible to indicate here all the possible derangements coming under this head, especially as observed in insanity, but their general character may be gathered from the following summary :—*a.* Impaired consciousness, from mere stupor to absolute coma. *b.* Disorder of the intellectual faculties, including perception and apprehension, thought, reasoning, judgment, and memory. Under this would come the various forms of delirium, mental confusion, delusions, illusions, and hallucinations ; or there may be mere failure or complete loss of one or all of the mental powers. In some cases they are unnaturally acute. *c.* Alterations in the moral feelings and actions, manner of behaviour, disposition, affections, spirits, and temper. *d.* Emotional disorder, as evidenced by the emotions being unduly excited or the reverse. *e.* Disturbance of speech as an intellectual act—*aphasia.* *f.* Disorder of sleep, including somnolence, insomnia, uneasy sleep with bad dreams, somnambulism, and somniloquism.

4. *Subjective disturbances of the special senses.*—*a. Vision.* The chief derangements of vision are photophobia or undue sensibility to light ; photopsia or subjective sensations of flashes of light, of iridic colours, sparks, muscæ volitantes or spectra : and defective sight, either dimness of vision to complete blindness, double vision or diplopia, or hemiopia, part of the field of vision being lost. *b. Hearing* may be affected, as

own by intolerance of sound; different degrees of deafness; or tinnitus aurium. *Smell* or *taste* may also be impaired or lost; unduly sensitive; or perverted.

5. *Alterations in general sensation and tactile sensibility.*—These comprehend:— Hyperæsthesia or undue sensibility to touch: and dysæsthesia or hyperalgesia, *i.e.*, due sensibility to pain. *b.* The opposite condition of hypæsthesia, anæsthesia, or algesia. There may be a sensation of something intervening between the skin and y object touched; or inability to distinguish the characters of the surface or form of object. *c.* Various kinds of pain and tenderness felt in different parts of the body. Paræsthesiæ or perverted sensations, such as numbness, tickling, itching, formition or creeping, heat or cold, pricking, tingling, aura epileptica.

6. *Impairment of the muscular sense.*—This deviation probably exists in certain ms of disease, and is evidenced by a difficulty in realising weight and resistance, in performing certain muscular acts without looking and paying attention to them; by a want of consciousness as to whether different muscles are contracted or not.

7. *Alterations affecting motility.*—These are of the greatest importance and come:—*a.* General restlessness and jactitation. *b.* Abnormal attitudes or movements ile lying, sitting, standing, or moving, *e.g.*, being coiled up; boring the head into pillow; disposition to stagger or fall, to advance irresistibly or run, rotate on an s, or proceed in a circle. *c.* Evidences of muscular weakness, in the way of general mbling; local tremors; or unsteadiness of a limb when raised. *d.* Signs of undue scular irritability, viz., twitchings; subsultus tendinum; rigidity; clonic or tonic sms; convulsive movements; and cramps or painful spasms. As varieties of ptoms due to spasmodic movements should be mentioned strabismus; rolling ut of the eyes; champing of the jaws; grinding of the teeth; and trismus or lock-. *e.* Paralysis. This symptom will be presently considered at length. *f.* Loss power in co-ordinating muscles for the performance of various acts. *g.* Automatic oluntary movements, such as those observed in chorea. *h.* Deficient or excessive ex irritability. *i.* Cataleptic fixity of a limb; or slow purposeless movements of ion and extension.

Changes in vascular supply, nutrition, and secretion.—The influence of the nervous tem on these processes is well known, and as illustrations may be mentioned the nge in temperature and the wasting with tendency to bed-sores in paralysed parts; disorders of nutrition and secretion accompanying neuralgia; and the influence of vous affections on the secretion of tears, saliva, or urine.

There are some important *extrinsic* symptoms often associated with nervous ases, viz., those referable to the stomach, bladder, bowels, and sexual organs, y of them being due to paralysis. They include nausea and vomiting; obstinate stipation, accumulation of fæces in the rectum, involuntary or unconscious defæca-; irritability of the bladder, retention or incontinence of urine, involuntary micturi; diminution or loss of sexual inclination or power, undue sexual excitability, or stant priapism.

Physical examination.—Objective modes of examination are highly important e investigation of nervous diseases, and the following outline may serve to indicate formation to be thus obtained:—

Examination of the head as to size, shape, state of the fontanelles, signs of

Examination of the spinal column as to shape or evidences of a tumour.

Tests of tactile sensibility.—In order to determine the state of cutaneous sensibithe effects must be noted of a slight touch or pressure; of tickling, pinching or g the skin; using Weber's, Sieveking's, Jaccoud's, or other æsthesiometer; electricity. Weber's instrument consists essentially of a pair of compasses, the s of which are covered with sealing-wax, and it is noted what is the shortest nce apart at which these can be recognised as separate points of touch, an ximate idea being thus gained as to the degree of sensibility of a particular

Tests applied to muscles.—When any muscles are supposed to be paralysed, it is sary to desire the patient to attempt different actions which would bring the ted muscles into play, and thus observe whether they are really paralysed, and to degree; noting whether the actions can be performed at all, or if they are ly produced and deficient in power. Some employ instruments to test the grasppower. When there is loss of co-ordinating power, the involved muscles should be tested. A matter of frequent importance is to determine whether muscular bility is retained or lost, as well as the degree of facility with which it is excited,

and it must suffice to state that one of three kinds of electric
structing the different appliances, viz. :—1. *Frictional*, *static*,
vanic or *Voltaic*, which may be used as a *continuous* or *inter*
neto-electric or *Faradic*, the so-called *induced* current, from
current can be produced. The diagnostic value of these se
the following remarks :—

(1.) In a case of supposed shamming of unconsciousness o
often be thrown upon its nature by giving the patient a tolerab
ing parts of the face with one of the handles. Even where
ness, as in cases of alcoholic poisoning, the degree of this ma
the effect of cautiously touching one of the features.

(2.) The most important use of electricity in diagnosis is
irritability or contractility of muscles, *i.e.*, the readiness w
b. The force with which they act. Either faradization or i
be employed, and for determining the irritability of muscl
necessary ; for testing the force, a strong one must be used.
paralysis that the irritability of the affected muscles is incre
into action by a much weaker current than those which a
same time, the force of contraction is greatly diminished, but
even by the strongest current. The information to be derive
electricity is twofold—(i.) It may reveal whether a part said
in this condition or not, which is especially important in cases
and after railway accidents. For instance, should one side o
paralysed, if it is found that in the corresponding muscles
compared with the healthy side, while the force of contraction
is greatly diminished, this gives certain evidence that paral
conclusion can be arrived at if the irritability and force are no
case in true paralysis. (ii.) Suppose a part to be really
reveal the relation of the muscles to the portion of the ner
nerves which supply them come. If the electric irritabili
more or less impaired, it shows either that the part of the ner
nerve originates is itself disorganised ; or that the nerve in
destroyed completely or partially ; or that there is some condi
selves, or perhaps in the minute branches of nerve distributed
them from acting under electricity, as is especially the case in
in certain local forms resulting from exposure to cold. I
electric irritability may be temporarily impaired from mere dis
of the current will then speedily restore it. Should it be
there is no loss of continuity in the nerve supplying the mus

increased to a slowly-interrupted galvanic current, while it is diminished or extinct to a rapid current and to faradization. By the employment of the slow current improvement may be brought about, and as this takes place the undue irritability diminishes, while it improves to the rapid current and faradization. Not uncommonly, after sudden paralysis muscular contractility becomes excessive after a few days; this indicates some irritation in connection with the brain or spinal cord, consequent upon increased vascularity, inflammation, or some other morbid condition.

(3.) Another use of electricity is to test the sensation which it produces in the skin, muscles, nerves, and nerve centres. Reference need only be made here to the first two. The general cutaneous sensibility to electricity is often increased in hysterical and nervous persons. If it is excessive on one side, it becomes a sign of central irritation. In general shock and some cases of hysteria, trance, and similar conditions, the electric sensibility of the skin is lessened or absent; as well as in some very rare cases of chronic central disease. It is often locally lost or impaired in connection with paralysis of a sensory or mixed nerve. Muscular sensibility is as a rule in proportion to the contractility. Occasionally, however, sensibility is lessened or extinct when contractility is normal, as in some cases of hysteria; and the reverse has been observed in certain instances of lead palsy. Sometimes also there is increased muscular sensibility while contractility is natural, as in myalgia and rare cases of central disease. If contractility, with muscular and cutaneous sensibility, are all impaired in a limb or in one-half of the body, the condition is one of shock or of extensive cerebro-spinal lesion.

F. When a limb is paralysed, the state of nutrition of the tissues must be noted, especially that of the muscles, by feeling them and by making circular measurements, for which a special apparatus has been invented by Dr. Reynolds; it should also be observed whether there is any local change in temperature, or in the characters of the pulse.

G. Examination directed to the special senses.—It may be requisite to test the sense of hearing, taste, or smell, but the most important matter coming under this head is the examination of the eye and of vision. This comprehends:—(i.) *Examination of the pupils*, observing whether both are contracted or dilated; if they are equal or unequal; and if they act properly under light. (ii.) *Testing the sight* in various ways, particular attention being paid to the *field of vision* in all directions. (iii.) *Examination with the ophthalmoscope.*—This instrument has now come to occupy a most important position as a mode of investigation of diseases of the nervous system. For a full account of this subject, and of the various kinds of apparatus employed, with the methods of using them, reference must be made to special works. It is, however, by practical demonstration that the use of the ophthalmoscope is best learnt, and considerable personal practice with the instrument is required before it can be satisfactorily employed. In the succeeding remarks a brief description will be given of the morbid appearances which may be presented, the structures to which attention must be directed being the optic disc, blood-vessels, retina, and choroid. At the outset it must be remarked that the normal amount of vascularity is subject to great variations, and therefore but little importance should be attached to slight alterations in this respect, unless they are changing or unilateral.

a. Hyperæmia.—This may be limited to the vessels of the disc or retina, or involve both sets. It is characterised by more or less increased redness, with enlargement of the vessels and apparent increase in their number, many radiating from the disc, and some appearing tortuous or varicose, there being in some cases little dark-red spots due to little "kinks" in the vessels. Pulsation in the vessels is often unusually distinct, especially on lightly pressing the eye-balls. Slight œdema of the disc may follow, dimming the edge, and veiling its surface. There may be subjective symptoms of dimness of vision, heaviness about the eyes, flashes of light, or iridic colours. The encephalic conditions with which hyperæmia may be associated are congestion, acute or chronic inflammations, especially meningeal, and tumours. It may exist as such; but is more frequently the first stage of an acute inflammation, especially when due to a tumour. *β. Anæmia.*—This condition may be persistent, as in general anæmia; or transitory, as in vascular spasm. As a rule the disc, retina, and choroid are affected. There is pallor, with emptiness and shrinking of the vessels. It may be attended with temporary blindness, flashes of light or muscæ volitantes, and general weakness of vision. The local causes are vascular spasm and embolism. Anæmia has been noticed in epilepsy and acute uræmia. *γ. Œdema of the disc.*—Most frequently accompanying other conditions, viz., hyperæmia, ischæmia, but especially neuritis, in rare instances œdema exists alone. *δ. Ischæmia of the disc—Choked disc.*—The opening in the sclerotic through which the optic nerve passes is an unyielding ring, and when there is any obstruction in connection with the cavernous sinus, preventing the return of blood by the ophthalmic vein, it is believed that strangulation is brought about at this aperture, which ultimately leads to serious changes in the disc. To this condition the term *ischæmia* is applied, which is described as being due to "obstruction at the cavernous sinus, with concurrent action of the sclerotic ring" (Von Graefe). When advanced, the appearances in ischæmia are those of intense congestion and inflammation, and it must be remarked that some of the best authorities deny that there is any essential difference between ischæmia and neuritis, either in characters or causation, and consider that the chief difference between them is one of degree. The disc is much swollen and prominent, generally rising steeply on one side and sinking gradually on the other, while the margin is obscured by infiltration and excessive vascularity, the latter giving it a mossy look, owing to the great increase in the number of capillaries. The colour may be deep-red, but is often a mixture of dirty-grey and red, from the mixing of exudation with distended capillaries and minute extravasations. The nerve-fibres are somewhat swollen, less transparent than in health, so that the papillary region looks more coarsely fibrous. Cell and nuclear proliferation takes place in the connective tissue between the bundles of nerve-fibres and around the vessels. The retina is only altered immediately around the disc, being opaque, its veins enlarged, with sometimes streaks of exudation along the larger of them. Some nerve-fibres are disintegrated. The trunk of the optic nerve is unaffected. This state frequently exists to a marked degree without any disturbance of central vision. The causes of ischæmia are meningitis, tumour, hydrocephalus, and caries of the sphenoid bone. *ε. Descending neuritis.*—This signifies inflammation extending along the optic nerve from within the cranium, the extension probably chiefly taking place along its connective-tissue. Hence the optic trunk itself is involved, and the morbid ophthalmoscopic appearances are chiefly confined to the disc, occasionally involving the adjacent retina. The ophthalmoscopic distinctions from ischæmia are thus described:—The disc is less swollen, and does not present the steep, one-sided elevation; the main trunks of the vessels are chiefly enlarged and tortuous, and there is not the great increase in number of the minute branches and capillaries observed in ischæmia; the colour is less intense and more uniform, with more opacity, and these appearances extend further into the retina; there is often a "woolly" aspect, probably due to œdema. Numerous small hæmorrhages frequently occur, which leave white spots. The intimate changes chiefly affect the connective-tissue, which undergoes proliferation, the nerve-fibres being subsequently disintegrated and wasted. A variety has been described as *perineuritis*, in which the outer neurilemma is most affected, the appearances being visible mainly in the margin of the papilla, and extending more widely into the retina. *ζ. Chronic optic neuritis.*—Here there is an early stage of redness of the disc, with in some cases hæmorrhages and slight effusions, followed by consecutive atrophy, the vessels gradually contracting and disappearing. *η. Retinitis.*—Very rarely resulting from cerebral disease, this is characterised at first by hyperæmia of the disc and retina, followed by silvery patches of exudation upon the latter. The entire retina is probably never affected from cerebral disease. The intracranial causes of all the varieties of optic neuritis are meningitis and cerebritis, in whatever way these may have been set up. The inflammation must be contiguous to the nerve, and the latter is more likely to be affected if the morbid process is severe or prolonged. Tumours and other morbid conditions may give rise to neuritis, but only indirectly, by first exciting inflammation of the cerebral structures. Chronic neuritis is said to be connected with abuse of tobacco, general paralysis, and locomotor ataxy. *θ. Atrophy of the disc.*—Two forms of atrophy are recognised, the simple, progressive, or primary; and the consecutive, which is secondary to ischæmia or neuritis. Dr. Hughlings Jackson distinguishes between them by the raggedness of the edges and blurring of the outline in the consecutive form; by the clean-cut even rim and more brilliant appearance in the primary form. Dr. Allbutt, however, considers that the condition described as simple atrophy often succeeds chronic neuritis, and that the ragged and irregular form is only transitional, gradual changes taking place in the products of inflammation, which are finally entirely removed. True primary atrophy may result from destruction of the fibres in the course of the optic nerve, so as to sever their distal ends from their central attachment, as by pressure of a tumour or inflammatory exudation; disease at the root of the nerve in the centres of vision; progressive sclerosis extending along it; or failure of nutrition from degeneration of arteries or lism. The ultimate appearances in atrophy are that the disc becomes white, ning, and more or less cupped; the smaller vessels fading away; the connective- being increased; and the nerve-elements disappearing.

. There is a peculiar tendency among malingerers to sham nervous affections, and metimes requires considerable ingenuity to detect the imposture. In any case re anomalous nervous symptoms are complained of, without any objective signs, ngering should be suspected, and the patient should be closely watched, without ng it appear that this is being done. The tests to be applied will, of course, vary ifferent cases, but as illustrations may be mentioned the use of chloroform; various hods of detecting shammed fits, as putting snuff under the nose, applying heat or d suddenly, pressing with the nail under the matrix of the thumb-nail; supporting upposed paralysed limb in an extended position and letting it fall suddenly; cking suddenly a part stated to be anæsthetic, while the patient is not looking; and e use of strong electricity.

/. In all cases of cerebral disorder it is of great importance to examine carefully e heart and vessels; and also to test the urine.

CHAPTER LXVIII.

ON CERTAIN CEREBRAL SYMPTOMS.

I. HEADACHE OR CEPHALALGIA.

ETIOLOGY.—The causes of headache are very numerous, and terms are often prefixed indicating its mode of origin, such as congestive, plethoric, anæmic, organic, nervous or idiopathic, neuralgic, dyspeptic, or bilious. The pathological conditions which may give rise to this symptom are:—1. Disturbance in connection with the cerebral circulation, either congestion, especially that due to general plethora, increased cardiac action, vaso-motor paralysis of the cerebral vessels (by inducing which many remote causes excite headache), or venous obstruction; deficiency of blood; or an abnormal condition of this fluid, particularly when it is hydræmic, imperfectly aërated, or impregnated with various deleterious ingredients. 2. Injuries or organic diseases of the brain or its membranes, *e.g.*, meningitis, cerebritis, abscess, tumour, softening. 3. Disease of the cranial bones, their sinuses, or of the structures forming the scalp. 4. Neuralgia, affecting the nerves either within or outside the skull. The chief remote causes which may excite headache by giving rise to some of the above conditions include anything which induces general plethora or anæmia; cardiac or pulmonary diseases, or fits of coughing; affections of the stomach, bowels, and liver; renal and cutaneous diseases; fevers and acute inflammations; ague or mere malarial influence; gout and rheumatism; uterine disorders; hysteria; various causes which exhaust or depress the nervous and vital energy, as sedentary habits, deficient ventilation, over-work in confined rooms, undue mental exertion, depressing emotions, exposure to the hot sun, particularly when fatigued, loss of sleep, over-lactation, venereal excesses and masturbation, abuse of coffee, tea, alcohol, tobacco, opium, and various other drugs which affect the brain. Some individuals are much more subject to headache than others, and especially delicate females of a nervous temperament.

effects of movement and change of posture, e
hanging down the head ; muscular exertion ; cough
firm pressure over the whole head or any part (
stimulants ; or pressure on the carotid arteries. *g.*
with soreness and tenderness over the scalp genera
ticular spot.

II. VERTIGO—GIDDINESS.

There are two distinct forms of giddiness, so far
the patient are concerned, in the one the feeling be
the body, and as if it were impelled in different dire
with a tendency to fall and unsteadiness of gait ; in
objects appearing to move and to assume abnon
sensation is often described as "dizziness" or "sw
much in intensity, and may be constant or paroxysı
it is only or chiefly felt on movement or in certain
on hanging the head down. It may be worse wher
in the recumbent posture in different cases ; closin
fixedly for a time at an object has often a marked
either aggravating or relieving the sensation. Oc
comes on during sleep, awakening the patient. C
symptoms are present, with disturbances of the spec

ETIOLOGY.—Vertigo is directly due to some co
which either causes it to receive wrong impressio
senses, especially that of sight ; or interferes witl
ordinating the muscles for movement. Probably
some disorder of the cerebral circulation, either gen
way of congestion, anæmia, or an abnormal conc
The causes of giddiness are either *centric* or *eccentri*
injury or organic disease of the brain or its memb
changes in the cerebral vessels : certain functional r

on to ear-affections as a cause of vertigo. Many of the eccentric
are supposed to act in a reflex manner, probably by influencing
culation.

tain forms of vertigo call for special notice. The gastric variety
cribed as occurring either in severe acute paroxysms coming on
suddenly, often due to an undigested meal, and sometimes
ing a grave character, being accompanied almost with loss of
ousness; or as a milder chronic complaint, either constant or in
nt attacks. The digestive symptoms are not prominent in most
se cases. The vertigo is of both kinds, but consists chiefly of
ent movement of external objects. The chronic form is rendered
by fasting, and is often relieved by a moderate meal or a little
ant, also by shutting the eyes or gazing fixedly at some object.
amskill describes what he terms *essential vertigo,* which is observed
in persons about 30 years of age, who do not complain of any
symptoms, but in whom there are signs of a weak heart and of a
l right ventricle. He states that it is not materially improved by
ies, unless these are accompanied by rest and freedom from
y of every kind.

III. DELIRIUM.

s symptom implies an acute and temporary disorder of the
l faculties, which generally reveals itself in the language or
s. It varies in degree from slight wandering and incoherence to
ost complete and thorough derangement of the mental faculties.
ently the patient has a fixed delusion. When the delirium is
the patient can often be roused temporarily, so as to be tolerably
nt. It may be constant, but commonly tends to be worse by
or may only come on at this time. In character the delirium may
d and quiet; more or less wild and violent, the patient shouting
ily, or attempting to get out of bed or to injure those around; talk-
and cheerful; surly; suspicious; low and muttering, when it is
ttended with picking at the bed-clothes or carphology. In many
lelirium is associated with more or less stupor.

OLOGY.—Delirium may arise either from excitement or depression
cerebral functions, being accordingly either active or passive. It
grey matter covering the cerebral hemispheres which is specially
d. The causes of delirium are:—1. Organic diseases of the brain
membranes, especially meningitis. 2. Reflex disturbance in con-
n with remote organs, as the stomach, bowels, or uterus, particularly
ided with severe pain. 3. A poisoned condition of the blood, as
rium tremens, acute febrile and inflammatory diseases, imperfect
on of the blood, poisoning by belladonna and other substances.
rvous exhaustion, as in delirium tremens partly, after excessive
, or from undue mental exertion. 5. Acute mania. Some indi-
s are much more liable to delirium than others, particularly
en and nervous persons.

ATMENT.—In order to relieve either of the head symptoms just
ered, a point of first importance is to find out its cause, as treat-
ias in most cases to be directed against this, and must vary accord-

ingly. In persons subject to headache or vertigo, attention to the diet, occupation, habits, and mode of life is frequently most essential. The various organs of the body must also be looked to, especially the digestive apparatus, heart, and kidneys. In many cases a course of vegetable or mineral tonics is highly serviceable. Arsenic proves very beneficial sometimes. When headache is merely temporary, associated with depressed nervous energy, stimulants will often relieve it, such as a little weak brandy and water, spirits of ammonia or chloroform, or a cup of strong coffee. Among local remedies which may be useful under various circumstances may be mentioned the use of cold, warm, or anodyne applications to the head; cold or warm affusion; sustained pressure around the head; sinapisms or blisters to the nape of the neck or some other part; and local removal of blood. Attention to posture may be of importance.

For delirium, if it is of the active kind and attended with much vascular excitement, the measures which may be needed are to shave the head; apply cold assiduously; use cold affusion; or remove blood. In other cases the aim of treatment should be to endeavour to procure sleep by means of some narcotic. Opium, which is sometimes usefully combined with tartar emetic or stimulants; hydrate of chloral; or full doses of bromide of potassium, often prove most serviceable. When delirium is of the low type, it is commonly an indication for the free use of stimulants. Warm affusion is often of much value in these cases. An important object to be always borne in mind is the removal from the system of any deleterious materials which may be causing delirium. Of course due precautions must be taken, if necessary, to prevent the patient from injuring himself or others. All external sources of disturbance must be removed, and the patient kept as quiet as possible.

IV. INSENSIBILITY—STUPOR—COMA.

These terms imply more or less suspension of consciousness, depending directly on some condition of the brain, complete coma being attended with absolute loss of sensation, perception, power of expression, and voluntary motion, or in other words, total abolition of all the cerebral functions. In investigating this symptom, it is important to take into consideration:—*a.* Its mode of onset, whether sudden or gradual, and if it is due to any obvious cause. *b.* Its degree, noting if there are any signs of sensation evinced, as by touching the conjunctiva; and also whether the patient can be roused temporarily or permanently. *c.* Whether it is transitory or persistent.

ETIOLOGY.—Pathologically loss of consciousness may result from injury to or compression of the brain substance; extreme cerebral congestion or anæmia; or the circulation through the brain of poisoned blood, or such as is inadequate to maintain its functions. Its numerous causes may be arranged thus:—1. Local injury to the head and its consequences, as concussion; fracture of the skull; compression. 2. General shock, from injury; rupture of an internal organ; severe mental emotion; or any other cause. 3. Certain functional nervous disorders, viz., epilepsy, hysteria, convulsions. 4. Diseases of the brain and its membranes, especially congestion; hæmorrhage; effusions in connection with the membranes or ventricles; cerebritis and abscess;

embolism or thrombosis; chronic softening; and some cases of tumour. 5. Blood-poisoning from morbid conditions within the system, as uræmia, diabetes, certain cases of jaundice, low fevers. 6. Introduction of poisons from without, especially alcohol, opium and other narcotics, or prussic acid; also the inhalation of certain gases and vapours, as carbonic oxide or anhydride, hydric sulphide, chloroform or ether. 7. Syncope from any cause. 8. Asphyxial conditions. 9. As special forms may be mentioned the unconsciousness which follows prolonged exposure to cold; sun-stroke; a stroke of lightning; or starvation. 10. It must not be forgotten that sudden insensibility is a favourite form of malingering.

TREATMENT.—The measures to be adopted when a person is insensible differ so materially according to the cause of this condition, that no uniform plan of treatment can be laid down. A few general hints may, however, be given regarding the management of the comatose state. The patient should be placed comfortably in the recumbent posture, with the head a little raised, all articles of clothing about the neck and chest being loosened, and plenty of fresh air admitted. If it is known or suspected that the coma is due to poison, or even if there is much doubt as to the cause, there ought to be no hesitation about using the stomach-pump, as it does no harm if properly employed, and may prove most serviceable. If the insensibility depends upon blood-poisoning, as from uræmia, means for promoting elimination, particularly by the skin, are highly valuable. In cases due to cerebral lesion it is well not to interfere too actively at the outset. The chief measures which it may be necessary to have recourse to in order to rouse the patient are shaking and calling loudly; dashing cold water over the face and chest, or cold affusion; application of sinapisms to the nape of the neck and various other parts of the body; the use of electricity; the administration of stimulants, especially by enema; and artificial respiration. In certain cases it may be requisite to remove blood locally or by venesection. It is important to see that the limbs are kept warm in cases of prolonged unconsciousness; that the bladder and bowels are properly evacuated; and that the system is maintained by adequate nourishment, which may be administered by enemata.

CHAPTER LXIX.

CONVULSIONS—ECLAMPSIA.

THE spasmodic movements implied by the term "convulsions" vary considerably in their severity and extent; and as to the parts of the body affected. Thus they may be slight and localised; unilateral; or more or less general. Not uncommonly they are accompanied or followed by partial or complete loss of consciousness. Convulsions are of most consequence in children, in whom a series of "convulsive fits" are liable to occur from very slight causes. They are frequently preceded by premonitory indications of nervous disturbance, such as twitchings, grinding of the teeth, restlessness or peevishness, which in children should always be looked upon as warnings. It is unnecessary to describe the distortion of the features and the various movements of the limbs and body which may result from the convulsive spasms, these being usually a combination of clonic and tonic, the former predominating. The chief dangers in convulsions arise from implication of the respiratory muscles or glottis, leading to grave interference with breathing; obstruction to the return of blood from the brain; and great exhaustion from extreme violence or frequent repetition of the fits, especially if they prevent sleep for a long period. Serious sequelæ may follow as direct consequences, such as hemiplegia; strabismus; loss of sight, smell, or hearing; defect of speech; or impairment of the mental faculties.

Ætiology.—Convulsions have been immediately attributed to "an abnormal discharge of unstable grey matter" (H. Jackson). They originate in some irritation, direct or indirect, affecting this grey matter. The main causes may be arranged thus:—1. *Centric.* *a.* Injuries to the head, especially fracture with irritation of the grey matter by spicula. *b.* Various organic diseases of the brain and cord or their membranes, viz., all forms of meningitis, hydrocephalus, cerebral hæmorrhage, rupture of an aneurism, embolism, softening, tumour. *c.* Idiopathic, dynamic, or essential. Here the convulsions are independent of any obvious organic mischief, but are supposed to result from some vascular or nutritive disturbance in the brain, as in epilepsy, hysteria, or the convulsions induced by strong emotions. *d.* Circulation of unhealthy blood through the central nervous system, *e.g.*, the convulsions which in children sometimes usher in or occur during the course of acute specific fevers or inflammatory diseases; uræmic convulsions; and those which may be associated with imperfect aëration of the blood, or, it is said, rheumatic fever, jaundice, syphilis, tuberculosis, and rickets. In the two conditions last-mentioned, however, the nervous system is probably highly susceptible, and convulsive movements may be excited by very slight reflex disturbance. 2. *Eccentric, reflex,* or *sympathetic.* In this class of cases the convulsions are due to some reflex irritation, particularly in connection with dentition; digestive disorders; intestinal worms; or the passage of a gall-stone or a renal calculus. Occasionally they result from direct irritation of some local nerve; the pricking of a pin in the clothes of a child; application of a blister; or a burn of the skin. Puerperal convulsions are either uræmic or reflex in their origin.

The most favourable periods of life for the occurrence of convulsions independent of organic disease are childhood, especially during the periods of dentition; puberty; when cutting the wisdom-teeth: and at the change of life. In children the common causes are reflex irritation; the onset of some acute fever or inflammation; tubercular meningitis; or the presence of some chronic constitutional illness. Later in life they are most frequently associated with epilepsy; organic affections of the central nervous system; and uræmia.

Treatment.—In treating convulsions the indications are:—1. To look for any reflex irritation and remove this if possible, particular attention being paid in the case of children to the teeth and alimentary

ncing the gums or giving an aperient or emetic if required, at
e time regulating the feeding. It is also well to examine the
for any source of irritation. 2. To treat any disease with which
ions may be associated, such as rickets, tuberculosis, epilepsy,
organic disease, or blood-poisoning. 3. To mitigate or check
vulsive movements. During a paroxysm the recumbent pos-
eedom from every disturbance; relaxation of the clothing about
k and chest; and a free current of cool fresh air are needed. It
dvisable to restrain the movements except in so far as to pre-
ury to the patient. Water may be sprinkled over the face and
If the convulsions continue, a warm bath containing mustard;
he head; warm pediluvia; cold or warm affusion; sinapisms to
e of the neck, epigastrium, or extremities, are the chief remedial
s which may be employed. Many practitioners resort at once
pplication of leeches to the temples or back of the neck, or to
tion, especially in the case of robust children; but in most cases
eedless or injurious, and as a rule removal of blood is only indi-
hen there are signs of serious interference with the respiratory
s. The principal medicinal remedies used are antispasmodics
rcotics, especially bromide of potassium; hyoscyamus in full
pium; hydrate of chloral; chloroform by inhalation; and assa-
by enema. Of course most of these need caution in their ad-
tion. It is of the greatest importance to endeavour to procure
this is much interfered with, particularly should there be much
ion. 4. To treat the consequences of the convulsions. The
ngers are from suffocation and exhaustion. For the former re-
f blood and artificial respiration are indicated. To prevent or
act exhaustion, it is extremely important to administer abundant
ourishment, especially in the case of weakly or badly-fed chil-
nd if it cannot be taken by the mouth enemata must be em-
Alcoholic stimulants are also most useful in many cases, being
nes required in considerable quantities, along with medicinal
nts, such as ammonia, ether, camphor, or musk. The adminis-
of food and stimulants often promotes sleep most efficiently.

CHAPTER LXX.

PARALYSIS.

I. MOTOR OR MUSCULAR PARALYSIS OR PALSY.

paralysis is a symptom of the greatest importance in nervous
s. Some of the main points to be noted with regard to it have
been indicated, and it is only needful further to remark that
lar attention must be paid to its mode of onset, whether sudden
lual; its exact extent and distribution; its degree; whether it is
ent or temporary, constant or variable, or influenced materially
ition, emotion, or other causes; as well as to its subsequent

progress, observing whether the paralysis tends to become worse, improve, or invade other muscles; and if any additional phenomena arise in the affected part, especially clonic or tonic spasms, rigidity, or permanent flexion of joints. The tendency in many forms of persistent paralysis is towards imperfect nutrition of the tissues, as evidenced by softness and flabbiness of the muscles and other tissues, wasting and diminution of the circumference of a limb, dryness and scurfiness of the skin; and to feebleness of the circulation, the pulse becoming small and weak, the skin pale or blue and congested, the temperature lowered, while the affected part is much more influenced by the temperature of the surrounding medium than in health, and œdema sets in in some instances. Occasionally an extraordinary growth of hair is observed over a paralysed part.

There are certain important varieties of paralysis, designated according to its mode of distribution in the body, some of which it will now be requisite to consider briefly. They include:—1. *General paralysis*, which does not necessarily imply that every muscle in the body is affected, but is applied to that condition in which both arms and legs are paralysed along with more or less of the trunk. 2. *Hemiplegia* or unilateral paralysis. 3. *Paraplegia* or paralysis of the lower extremities; the lower part of the trunk with the bladder and rectum being often involved at the same time. 4. *Disseminated or irregular paralysis*, when the paralysis is distributed in various parts of the body, as for instance in the arm and leg on opposite sides; or in the limbs on one side and the face or eye on the opposite. 5. *Local*, where the palsy is limited to one limb or a part of it; to certain muscles supplied by a special nerve, as the facial, or associated in their action for a particular function; or even to a single muscle.

1. GENERAL PARALYSIS is met with:—(i.) Rarely in cerebral diseases, viz., temporarily in congestion; hæmorrhage into certain parts, as into the pons, both ventricles, or the meninges; and in some cases of tumour, extensive softening, or meningitis. (ii.) In disease or injury of the upper part of the spinal cord. (iii.) In the early stage of essential paralysis of children. (iv.) As a sequela of diphtheria. (v.) In extreme progressive muscular atrophy. (vi.) In general paralysis of the insane. In the disease last-mentioned the paralysis begins in the tongue, as shown by impaired articulation, with tremulous movements and a difficulty in protrusion of the organ. Next the muscles of the face quiver, especially those of the lips, while the pupils are often unequal. Then follows weakness of the limbs, with unsteadiness of gait, the patient stumbling and staggering on turning round suddenly, while the ability to perform various ordinary actions is impaired. More or less speedily, and usually by interrupted grades, the paralysis extends and increases until the patient becomes utterly helpless; is unable to swallow, food passing into the larynx; the pupils are unequally dilated; and urine and fæces escape involuntarily. Automatic and reflex movements also cease. The muscles do not waste much as a rule, and they retain their electric irritability. During the progress of the paralysis twitchings and spasms are common. The muscular sense is much affected. Cutaneous sensibility is generally impaired and finally lost. Mental derangement usually precedes the paralysis; it may assume

us types, but in most cases there is a brief period of melancholia, wed by a marked change in character, then incoherence with delu- as to personal importance and greatness, the patient imagining elf to be extremely strong, wealthy, of high birth, or possessed of lerful sexual powers. The ultimate condition is one of extreme entia, the mind becoming a complete wreck.

HEMIPLEGIA.—In the majority of cases of one-sided paralysis only muscles of the arm, leg, trunk, lower part of the face, and tongue nvolved. In some cases there is a difficulty in wrinkling the fore- or closing the eye; or on the other hand the upper eyelid may . Speech is often affected, but usually only in right hemiplegia. If aralysis is complete the arm and leg are quite helpless, and in the mbent posture the leg tends to rest on its outer side, with the toes ed. If it is partial, but still well-marked, the gait is usually very liar. The patient leans towards the sound side, lifting up the site shoulder, and while the arm often hangs helplessly, the leg ng progression is carried forward by describing a kind of outward g or sweep, while the toes are directed downwards towards the nd. In less marked instances the leg merely drags, the toes, how- pointing downwards, while the arm cannot be moved well, and the r of squeezing is diminished.

ot uncommonly partial restoration is effected in hemiplegia, which st always commences in the leg, beginning above and extending nwards, the muscles on the front of the leg being last restored. The may remain for a long time or even permanently disabled. Gene- there is no limitation of the reflex movements of respiration on the cted side, at least for some time; further, other reflex movements be readily excited, sometimes even more easily than in health; le the paralysed muscles of expression can in some instances be ght into play under the influence of strong emotion. Electric ability is not impaired as a rule, except after long disuse of the cles, and then it can be soon restored.

TIOLOGY.—(i.) Hemiplegia is in the large majority of cases a sign ganic cerebral mischief, the paralysis being on the side opposite to of the disease. The great centres of motion, viz., the corpus tum, and anterior part of the optic thalamus must either directly indirectly be interfered with, and probably hemiplegia may result actual destruction, compression, hyperæmia, or anæmia of this ion of the brain. The morbid conditions which thus give rise to iplegia are:—*a*. Rarely congestion, it being then merely temporary. æmorrhage most commonly. *c*. Embolism or thrombosis of a con- rable artery. *d*. Acute cerebritis or softening, and abscess. *e*. Chronic ning from any cause. *f*. Cerebral tumour. *g*. Unilateral menin- (ii.) In very exceptional instances hemiplegia results from uni- al disease of the spinal cord. Of course there is then no facial lysis. (iii.) Occasionnally it is observed in connection with certain tional nervous diseases, apart from any evident organic lesion, viz., ea, epilepsy, and hysteria. It may also be associated with parturi-

PARAPLEGIA.—This form of paralysis varies much in degree, and es on either gradually, rapidly, or suddenly. When it is complete, the utter helplessness of the legs as the patient lies or when made to attempt to stand supported on each side, is very striking; in less advanced cases there is more or less weakness and difficulty in movement, with unsteadiness of gait, dragging of the feet, and stumbling while walking. Reflex movements are usually very easily excited. The condition of electric irritability varies.

ETIOLOGY.—(i.) Paraplegia is in the large majority of cases the result of injury to or disease of the spinal cord. Thus it may be due to:—*a.* Fracture or dislocation of the spinal column; or a wound or violent concussion of the cord. *b.* Compression of the cord from without by a tumour. *c.* Caries of the spine and its consequences. *d.* Congestion, when the paralysis is usually partial. *e.* Spinal meningitis. *f.* Acute myelitis. *g.* Chronic softening or sclerosis. *h.* Hæmorrhage into the cord. *i.* Morbid growths or parasites in its substance. (ii.) Sometimes paraplegia is a purely functional disorder, being met with in hysteria or as the effect of some powerful emotion; and also as a reflex phenomenon in connection with uterine affections, pregnancy, urinary diseases, dentition, or worms; or after exposure to cold and wet.

4. LOCAL AND SPECIAL PARALYSES.—It is not intended here to describe the many varieties of local paralysis which may come under observation, but merely to point out their general causes, and to consider the chief facts relating to paralysis of certain special motor nerves.

Local palsy may be an indication of slight or commencing central disease, but in the majority of cases the cause is peripheral, either directly affecting one or more nerves or certain muscles. This peripheral paralysis may be due to:—(i.) Destruction of a nerve from injury. (ii.) Pressure upon it by a tumour, aneurism, or inflammatory thickening; or mere temporary compression, as from long sitting or lying on the arm. (iii.) Changes induced in the nerve itself, probably mostly inflammatory, from neighbouring irritation, as that of necrosed bone or ulceration; exposure to cold; syphilis; rheumatism or gout. (iv.) The entrance of certain poisons into the system, especially lead; or, it is said, malarial poison. (v.) Changes in the muscles, either atrophic or degenerative, as in progressive muscular atrophy. Local paralysis may be a sequela of diphtheria; or more rarely of other febrile affections. It may also result from local embolism.

FACIAL PARALYSIS—BELL'S PALSY.—Paralysis of either facial nerve, and consequently of one side of the face, is the most important local variety that comes under observation in practice, the entire nerve being then usually involved. The signs are as follows:—There is a complete absence of expression on the affected side, which appears flattened and smooth, the features being blank and meaningless. The half of the mouth seems broader than the opposite, while the angle falls. Sometimes saliva flows from the mouth. The ala of the nose falls in and consequently the nasal aperture is diminished in size. The healthy side appears to be or is actually drawn away, and the angle of the mouth raised. The eyelids on the paralysed side are unusually apart, the lower one dropping down, and as they cannot be closed the tears tend to trickle down the cheeks; the corresponding nostril is dry; and the constant exposure of the eyeball soon leads to irritation of the con-

ctiva, which is liable to be followed by serious injury to the deeper
ctures. It is, however, on attempting to bring the affected muscles
play that the most evident signs are afforded. The patient cannot
e, weep, wrinkle the forehead, elevate the eyebrow, frown, close the
ids, knit the brows, or expose the teeth on the paralysed side.
culation of labial sounds is impaired, as well as the ability to
tle; while if the patient is directed to blow out the cheeks, the
ted one flaps loosely. When masticated the food tends to collect
een the cheek and gums, while fluids often run out of the mouth;
ower of spitting is also impaired. If the facial nerve is implicated
certain part of its course, other less obvious signs are said to be
rved, dependent upon some of its branches being distributed to
ongue, salivary glands, and palate, viz., perversion of taste on one
and occasionally slight drawing of the tongue towards the same
; deficient secretion of saliva; relaxation and imperfect action of
elum palati on, and pointing of the uvula towards the affected
; with a somewhat nasal character of the voice.

IOLOGY.—It is of considerable importance to recognise in what
of its course the facial nerve is implicated, and to determine the
of the mischief. The causes of facial paralysis may be summa-
thus:—(i.) Organic mischief in the brain involving the root of the
. (ii.) Pressure upon the nerve within the skull after it has left
rain, especially by various kinds of tumours and meningeal exuda-
. (iii.) Injury or disease involving the nerve in its course through
emporal bone, chiefly from necrosis of the petrous portion of bone
nshot injury. (iv.) Causes affecting the trunk or branches of the
after its exit from the stylo-mastoid foramen, viz., injury, as from
or contusion; pressure by parotid and other tumours or enlarged
ls; direct exposure of the side of the face to a cold draught of air,
travelling by train with the window open; general exposure to
and wet; gout, rheumatism, syphilis; or, it is said malarial influ-

AGNOSIS.—The diagnosis of the origin of facial paralysis rests on:—
he history of the case, as revealing some of the causes just enume-
; and also the mode of onset of the paralysis, whether sudden or
ual. 2. The accompanying symptoms. Thus, when the paralysis
e to cerebral mischief, there are generally signs of this, such as
plegia and mental disturbance; if there is some intra-cranial pres-
beyond the brain, headache and other local symptoms are com-
y complained of, while other cranial nerves are frequently involved,
there is sometimes paralysis of the limbs on the opposite side. If
emporal bone is diseased, deafness and otorrhœa are usually pre-

If the nerve is affected outside the skull, some cause of pressure
be obvious; there may be no symptoms whatever except the
ysis; or the sensory nerves of the face are sometimes affected as
in the direction of neuralgia or anæsthesia. 3. The extent of the
involved. When facial paralysis arises from cerebral causes, it is
the lower part of the face which is in most cases prominently
ted, the muscles of the eyelids and forehead either acting normally
ing only slightly weakened. In all the other forms the whole side
e face is paralysed. It is only when the nerve is implicated in its

course through the temporal bone that the palate and tongue affected. 4. The degree of electric irritability. In cerebral para electric irritability is retained, unless the disease lies at the origin o nerve; in all the other forms it is impaired or lost temporarily or manently, except when due to cold, when there may be incr irritability to a slow galvanic current. 5. The progress of the cas effects of treatment. For instance, when due to tumour, injury, or disease, the paralysis is generally persistent; after cold, rheumatis syphilis, it may often be cured by proper treatment.

In very rare instances double facial paralysis is observed, bu difficult to recognise. It may be due to centric disease, esp hæmorrhage into the pons; or, it is said, disease of the nerves exposure to cold, rheumatism, or syphilis.

PARALYSIS IN CONNECTION WITH THE EYE.—The nerves to b sidered here are the ***third***, ***fourth***, and ***sixth***. Complete paralysis third nerve is indicated by ptosis or dropping of the upper eyeli inability to raise it; permanent external strabismus; dilatation pupil; and a difficulty in adapting the eye to vision at differe tances. In some cases only ptosis is observed when the paral peripheral in its origin. The cause may be centric disease; p upon the nerve in its course; exposure to cold; or rheumatism. the fourth nerve is paralysed, the superior oblique muscle cann Paralysis of the sixth is evidenced by persistent internal strab These forms of paralysis are generally associated with some press the course of the nerves, especially by a tumour or meningeal exu Sometimes all the nerves of the eye are simultaneously affected.

PARALYSIS OF THE TONGUE.—As a rule unilateral paralysis tongue, dependent upon implication of the *hypoglossal* nerve, is of hemiplegia. The signs are:—a widening of the tongue affected side; difficulty in its movement and protrusion; deviatio organ to the sound side when in the mouth, to the paralysed sid protruded; and impaired articulation. The entire tongue may b lysed, rendering articulation impossible, and deglutition very diff

It will be convenient here to make a few remarks with reg *aphasia*, a term which is now in frequent use, and the meaning of it is requisite to understand. An individual may not be able to proper use of articulate language from three distinct sets of cause There may be mental incapacity and loss of intellectual power. no ideas are originated in the mind which the individual wi convey 2. The intellect may be intact, or at least not so impa to prevent the formation of ideas, but the patient cannot recoll words requisite to express his thoughts, or cannot arrange the proper manner. 3. There may be merely a difficulty in the mec act of articulation, owing to paralysis of the parts necessary for viz., the tongue, lips, and palate, the power of thought and expression, as evidenced by the ability to write sensibly, being p natural. It is to the second of these conditions that the term is strictly applied, viz., where articulate language is interfered wi intellectual act. The degree of impairment varies widely in d cases. A distinction has been made between the *amnesic* var aphasia, in which there is a loss of memory of words; and the which there is a presumed lesion of the cerebral apparatus of co-dination, so that the words cannot be duly arranged. Some patients n read distinctly enough, but are unable to compose sentences for mselves, even so far as to answer the simplest question. They may rely repeat the same word or part of a word, or only unintelligible nds; or they apply wrong names to persons and things. With re-d to writing, some patients are able to perform this act, while others not do so at all, the last being generally the subjects of right hemi-gia. Those who can write occasionally write sense, frequently non-se, but more frequently either unintelligible characters or distinct unconnected words (Reynolds). As a rule the mental condition in sic patients is more or less impaired, but the degree of impairment ges from what is scarcely appreciable to complete loss of mental power.

Aphasia is in the large majority of cases associated with right hemi-gia, and the morbid condition to which it is most frequently due mbolism of the left middle cerebral artery, as was first pointed out Dr. Hughlings Jackson. It may depend upon tumour, hæmorrhage, ning, meningitis, and other cerebral lesions; and I have known it to e temporarily from mere vaso-motor disturbance. As regards the lisation of the lesion in the brain, many adopt the view of Broca, that second and third left frontal convolutions of the cerebrum are the seat the faculty of articulate language, and that these must be interfered when aphasia is observed. Others consider that there must be a n of some part of the corpus striatum. or of certain motor nuclei intercommunicating fibres in its neighbourhood. Niemeyer partly lains the frequency of aphasia in connection with disease of the tal lobes by the fact that pressure acting on one side in this region readily propagated to the opposite, so that the brain becomes terally disordered.

ARALYSIS OF THE PHARYNX is mainly indicated by great difficulty impossibility of swallowing; and thickness of speech. When the rior *maxillary* nerve is involved the muscles of mastication are lysed.

REATMENT.—The objects to be aimed at in treating paralysis of any t are to restore the muscles to their normal activity as speedily as sible, if this is practicable; and to counteract the tendency to those phic and other changes to which the structures are liable. Of course measures to be adopted must first of all have reference to the cause the paralysis, by removing which restoration is often rapidly and pletely effected. As illustrations may be mentioned the use of de of potassium in the treatment of paralysis due to syphilis or lead. many forms of paralysis time is a most important element in treat-t, and much harm may be done in not a few instances by inter-g too actively or too soon. It is requisite to see that a paralysed t is properly covered with warm clothing, and that it is kept clean. e chief local measures employed to counteract palsy are systematic ive motion of joints, which may be combined with efforts at volun- movements; various baths and douches, either hot or cold; friction, er with the hand alone, with flesh-brushes or gloves, or with some ulant liniment; shampooing; and electricity, which also may be fully combined with voluntary attempts to move the muscles.

arrest of the progress of the disease. 3. Increa
a part, thus removing coldness, blueness, and
circulation. 4. Improvement in the nutrition c
and other structures, should they be atrophied or
vention, retardation, or removal of spasmodic co
6. Probably the long-continued use of electricity
tion of the part of the nerve-centre from which th
the affected muscles originates. The kind of ele
in different cases, but it may be stated generally
action of muscles faradization and the interrupt
most useful, though franklinic electricity is occas
than either; that for improving the circulation a
tinuous galvanic current or faradization by mea
answers best; whilst to oppose the excessive actio
movements and rigidity (and this applies to thes
circumstances) a weak constant galvanic curren
rupted faradization may be applied to the affected
conditions of rigidity the use of faradization or
to the antagonistic muscles is most efficacious.

Some general hints as to the employment of
paralysis may be serviceable. Care must be tak
patient. The current used must not be so stron
on the other hand so weak as to be useless; and
be brief, so as not to tire the patient or the
repeated twice a day, daily, or every other day
stances. In employing galvanism, one handle c
sufficient size and well-wetted must be kept fixed i
shoulder or in the bend of the elbow in the case
and the other drawn slowly along the muscles
faradization the two poles must be kept near tog
always best to hold both in one hand and draw th

uld there be head-symptoms, such as headache, sense of weight, or ddiness. Much improvement may be effected in other cases in the rious directions already indicated; but so far as the paralysis itself is ncerned, the value of electricity will depend on the degree of con- ctility shown by the muscles on its first application. If this is normal nearly so, the power of voluntary movement can be but slightly if at all creased by its application. If it is much diminished from want of use, uch good may be done by reviving the contractility of the muscles, t once this has become normal no further improvement as regards luntary motion can be effected.

(2.) *Spinal.*—If the muscles act readily under electricity in cases of mplete spinal paralysis, the power of voluntary movement in the bs cannot be increased by its use, but sometimes the functions of the dder, rectum, or sexual organs may be much improved by its local plication to the anus or perinæum. If the paralysis is partial and con- ctility is impaired, much good may be effected up to the point of storing the contractility; electricity must not, however, be employed acute cases of this kind, but it is of the greatest value in those which ve set in slowly. If there is atrophy of the limbs, galvanism is most ficacious; if none, faradization. Should there be the complete "spinal alysis" of Marshall Hall, electricity cannot improve the power of vement, and if no sign of contractility is observed after a few plications, it is useless to proceed with it; if the contractility is tely impaired, much improvement may often be brought about. In es of infantile paralysis due to spinal disease, the use of the slowly errupted galvanic current frequently proves very serviceable for a e when other forms of electricity fail, but as the muscles improve their action faradization becomes most efficacious.

(3.) *Local.*—Should a nerve be completely destroyed in its course, d electric contractility be quite extinguished, no improvement can be fected by electricity. In some cases, however, the morbid changes in e nerve disappear, but more or less paralysis persists from want of e. Here electricity is of great service, and it will be well in such ses to continue its application for some time, provided any contrac- on can be excited. In certain cases of local paralysis from lead, cold, d other causes, the use of a slow galvanic current has most effect pon the muscles, as previously explained. Under such circumstances, erefore, this should be used at first, and a gradual change made to radization as improvement is perceived.

A few special remarks are needed with reference to the treatment of cial paralysis from cold. The local application of heat and moisture nstantly, leeching, and steaming, are the measures which are most eful at first; followed by blistering, friction with stimulating liniments, d the employment of a slow galvanic current. Iodide of potassium, inine, or strychnine act beneficially in some cases.

II. SENSORY PARALYSIS—HYPÆSTHESIA—ANÆSTHESIA.

This subject needs but a brief consideration. Tactile sensibility ay be more or less diminished or completely lost. The distribution of e paralysis presents the same variations as in the case of motor

this nerve is distributed, and when the patient at
a glass or cup a very curious feeling is experience
broken opposite the middle of the upper lip.
tion are frequently seriously interfered with wh
paralysed.

TREATMENT.—The general remarks made as
paralysis of motion apply equally to that of sens
friction, and electricity are often useful. The latt
to for some time in anæsthesia or hypæsthesia fro
even then only very cautiously; it does not le
ment in most of these cases. Faradization w
Electricity is often very beneficial in various forn
met with in hysteria, either faradization or fran
employed, the latter by directing sparks on to the
ing this and then drawing sparks; or applying a
Leyden-phial. If sensibility is lost locally from
no benefit can be anticipated from electricit
sensory paralysis are combined, electrical treat
former may improve the latter at the same tim
necessary in cases of sensory paralysis as re
avoidance of pressure.

CHAPTER LXXI.

NEURALGIA.

NEURALGIA or nervous pain is a comprehensive t

hich lead to depression and weakness of the nervous system,
nged worry and anxiety; undue mental exertion; strong emo-
neral concussion of the nervous system, as from a railway
; hysteria; excessive fatigue; exposure to heat; ennui and
s habits; excessive venery. 5. Degenerative changes asso-
ith the decay of life, and those which precede the onset of loco-
taxy. 6. Rheumatism, gout, syphilis, or exposure to cold and
n the cases last-mentioned, however, neuralgia is probably
he result of inflammatory and other changes in the nerve itself;
essure by surrounding thickening of fibrous membranes or by

nportant group of causes of neuralgia act locally, including:—
ry to a nerve in some part of its course, as from contusion;
by a needle; partial section; the lodgment of a foreign body,
a piece of glass, when the pain may be felt in some distant part.
nerve is completely cut across, either itself or some other nerve
to it now and then becomes subsequently the seat of neuralgia.
sure, *e.g.*, by foreign bodies, such as a bullet; cicatricial thicken-
old adhesions; neuromata; tumours, aneurisms, or enlarged
callus uniting fractured bones; congested veins; or from long
tight boots, or hanging the arm over a chair. 3. Irritation of a
y necrosed bone, especially when it passes through a foramen or
n this condition; carious teeth; surrounding inflammation or
on; or direct exposure to a cold draught. Even when neuralgia
in its origin, its occurrence is greatly influenced by the general
the system, and Anstie went so far as to affirm, "it is universally
that the existing condition of the patient at the time of the
et of the disease is one of debility, either general or special."
the chief *predisposing causes* may be mentioned the female sex;
periods of life, especially that of sexual development, and about
nd middle age; hereditary tendency to nervous affections; and
us temperament. An acute attack is predisposed to or intensi-
fatigue or any other lowering influence. It may come on quite
eously; or be brought about by mental disturbances, pressure,
at, over-exercise, and numerous other influences.

logically neuralgia may be connected with some evident morbid
in the affected nerve or nerve-centre, but as a rule no such obvious
can be detected. Probably in some cases the nerve is more or
gested or inflamed. Marked atrophy with degeneration of a nerve
n found in connection with neuralgia from pressure, occasion-
advanced as almost to render sensation extinct. Anstie writes,
k it most probable that in *all* cases of neuralgia there is either
, or a tendency to it, in the posterior or sensory root of the
nerve, or in the central grey matter with which it comes in
connection."

TOMS.—Pain is the essential symptom of neuralgia. The import-
racters of this pain are as follows:—1. It is almost invariably
al. 2. In recent cases it is distinctly intermittent, coming on in
r less sudden paroxysms, usually at irregular intervals, but occa-
at regular periods, especially in malarial cases; later on it is
ore or less remittent. 3. *The pain* during the paroxysms is gene-

friction has the same effect; in others, however, derness. The paroxysmal pain often ends as ab with a sense of extreme relief and comfort. Th is much less severe, of dull or aching character, neuralgias presents circumscribed points of tend reux," corresponding to the exit of branches of foramina or openings in fibrous membranes, th patient to be diffused beyond these spots, in sensation of tolerably extensive contusions. It treatise like this to indicate the seat of all the the different local neuralgias, but a knowledge o nerve affected and of the points at which its b ficial, will enable their situation to be recognise

There are certain general facts to which it When neuralgia is local in its origin, the pa gradually; is more constant; and less capable age neuralgia is commonly very severe and i tenderness being often intensely painful. Once there is always a liability to its recurrence, and regular periods. An individual may have had and then be quite free from it for many years, b the complaint at a later period of life. Differe cated in different attacks, or even during the sa

Some interesting *complications* are often as affecting sensation or motion; the state of th secretion. The chief of these which have be hyperæsthesia, hypæsthesia, or paræsthesiæ, su or formication; disturbances of the special s sight; spasmodic twitchings, tonic spasms, c even local paralysis; pallor, followed by redne of the arteries, increase in temperature, and *brachial.* 5. *Intercostal.* 6. *Mastodynia or irritable breast.* 7. *Lumbo-abdominal.* 8. *Sciatica.* 9. *Crural.* The visceral group will not be further alluded to, some of them having been already considered under their respective organs. The names applied to the several forms of superficial neuralgia will indicate their respective localities, but a few need special comment.

TIC-DOULOUREUX—BROW-AGUE—PROSOPALGIA.—This is one of the most common forms of neuralgia, the *fifth* or *trigeminal nerve* being involved. Rarely are all the divisions implicated, and it is the ophthalmic branch which is most frequently affected, the pain, therefore, being chiefly felt above the orbit and about the temple. Numerous points of tenderness are described, but the most important are the *supra-orbital* and *parietal*, the latter being just above the parietal eminence, and corresponding to the inosculation of several branches. A variety of this neuralgia is named *clavus hystericus*, in which there is extreme pain, in character as if a nail were being driven into one or more spots, usually corresponding to the supraorbital or parietal points.

HEMICRANIA—MIGRAINE OR MEGRIM—SICK-HEADACHE.—Considerable attention has been paid of late to the complaint recognised by the above names. It will be convenient to treat of it here, as it is considered by many pathologists to be a form of neuralgia, though opinions are by no means unanimous as to its nature. Most authorities regard sick-headache as being quite independent of any morbid state of the alimentary canal, and as essentially a nervous affection. Allbutt, however, considers that derangements of the abdominal viscera have an important influence in giving rise to migraine. The chief views as to the pathology of this malady are as follows:—1. That it is a form of neuralgia of the ophthalmic or occipital nerve; or of the filaments distributed to the dura mater. Some regard this neuralgia as merely due to peripheral causes, but Anstie, who was strongly in favour of migraine being a form of trigeminal neuralgia, attributed it primarily to a morbid condition at the root of the nerve in the medulla oblongata, its central nucleus in this part being the seat of atrophic molecular irritation, which has an unusually strong tendency to communicate itself to the neighbouring and closely connected nucleus of the vagus. 2. That the complaint is due to vaso-motor disturbance affecting the vessels of the head, produced through the sympathetic nerve. Latham considers that in the premonitory stage of sick-headache the small arteries are contracted, owing to excitement of the vaso-motor nerves, which depends upon a weakening of the controlling power exercised over them by the cerebro-spinal system, this probably originating in the medulla oblongata. During the stage of headache it is supposed that the nerves become paralysed and the vessels consequently dilated, and Latham is of opinion that this paralysis is the result of depression following the previous excitement. 3. Liveing in his admirable work has advanced the hypothesis that the paroxysms of migraine are due to "nerve-storms, traversing more or or less of the sensory tract from the optic thalami to the ganglia of the vagus, or else radiating in the same tract from a focus in the neighbourhood of the quadrigeminal bodies."

The chief *predisposing causes* of migraine are the female sex, attacks being peculiarly liable to occur about the menstrual periods; hereditary tendency to the complaint, or to various other neuroses; anæmia and general want of tone; and a nervous, excitable temperament. A paroxysm often comes on without any obvious *exciting cause:* but it may follow errors in diet; exposure to the sun; breathing vitiated air; undue mental excitement or effort; fatigue, especially with fasting; excessive sexual indulgence; and various other causes which lead to physical or mental depression. Sometimes it results from some disturbance affecting the sight or hearing.

SYMPTOMS.—Sick-headache is characterised by periodic attacks, which usually commence during the period of bodily development from 15 to 25; as a rule becoming more frequent and severe up to a certain time; but tending to diminish in frequency or even to cease altogether in advanced age, particularly after the change of life in women.

An attack is generally ushered in by some premonitory symptoms, which are mostly observed when the patient awakes in the morning, such as a sense of depression, heaviness, or general uneasiness; vertigo; disturbed vision, especially a wavy glimmering; chilliness and shuddering; coldness of the hands and feet; tingling in the arm or tongue; irritability of temper; yawning, gaping, or sighing; disorder of speech or hearing; disinclination for food, with a slimy taste. Soon the pain commences and speedily becomes intense. Almost always it is unilateral, felt chiefly in the supra-orbital region .or sometimes within the orbit, but not uncommonly extending over the whole side of the head. The precise character of the pain varies much in different cases, but it is generally throbbing. Pressure on the carotid artery usually diminishes its intensity. There is increased local heat, and in many cases redness of the conjunctiva is observed, with an excessive flow of tears. During a severe paroxysm the patient usually takes to bed, feels extremely depressed and low, dreads every disturbance, begs to be left at rest, and is especially sensitive to light and noise. The pulse is frequently slow and soft. The pupils are contracted. When the suffering reaches its height, nausea and bilious vomiting generally set in, aggravating the pain, but afterwards this gradually diminishes, and the patient usually falls asleep. Anstie remarks that this vomiting is not ordinarily remedial but that it "merely indicates the lowest point of nervous depression." Vomiting may be directly beneficial, however, if there is much undigested food in the stomach. On awaking from sleep it is found as a rule that the pain has ceased, but there is frequently a little superficial tenderness for a day or two, and the patient feels out of sorts. The duration of an attack is very variable in different cases, but it does not commonly last more than twenty-four hours, though it may go on for two or three days or more.

INTERCOSTAL NEURALGIA.—In this variety the pain is felt along the course of one or more intercostal nerves. Those on the left side, especially from the 6th to the 9th, are most frequently affected. There is a constant pain, mostly corresponding to the point of exit of a lateral cutaneous nerve, and increased by a deep inspiration or coughing, or sometimes by moving the arm. Shooting pains are also experienced at intervals, extending from the spine along the intercostal spaces, or from the lateral point backwards and forwards. Three very distinct "points douloureux" can generally be detected, viz., 1. Vertebral. 2. Lateral opposite the lateral cutaneous branch. 3. Sternal or epigastric, where the anterior cutaneous nerve perforates. This variety of neuralgia is very common in anæmic and chlorotic females. It also frequently precedes herpes zoster, and a very severe and obstinate form is liable to follow the latter in old people. For the diagnosis of this pain from that of pleurodynia or pleurisy, the condition of the patient; the want of connection of the pain with any excessive or prolonged exercise of the local muscles, of any marked exacerbation from their use, or relief from rest; the characters of the pain, with the points of tenderness; and the results of physical examination are generally quite satisfactory. The breaking out of herpes is pathognomonic.

SCIATICA or HIP-GOUT are the names applied to neuralgia in the course of the branches of the sciatic and other nerves about the hip. Generally the pain is mainly seated in the back and outer part of the thigh but it may affect various parts of the lower extremity, down to the leg or foot. There is generally a persistent and deep pain near the tuberosity of the ischium, which is increased paroxysmally, shooting up or down, either without any cause, or as the consequence of pressure, movement, especially a sudden jerk, or even coughing. The patient is often obliged to walk very carefully, or may be unable to move at all. Local anomalies of sensation; spasmodic movements; cramps; and partial paralysis are very common. Many cases are exceedingly severe and unyielding to treatment. The limb may waste from want of use.

The local causes which most frequently give rise to sciatica are long-continued sitting; direct exposure to a cold draught, as in using windy privies; and sitting on a cold or damp surface. Not unfrequently this complaint is associated with gout or rheumatism.

TREATMENT.—The general principles applicable to, and the chief remedies employed in, the treatment of all forms of superficial neuralgia will now be briefly considered. 1. Any local cause of irritation must be removed. In regard to this point a word of caution is necessary respecting "tic-douloureux." This complaint is often attributed to decayed teeth, and not unfrequently these are extracted one after another without any improvement resulting, for the simple reason that the neuralgia is not dependent upon this cause at all. 2. It is highly important in the case of those who are subject to neuralgia, to adopt measures to prevent attacks, such as attending to diet and hygiene; wearing warm clothing; regulating the state of the alimentary canal; and, in short, promoting a state of good general health in every possible way; at the same time avoiding every cause which is likely to bring on a paroxysm. 3. Treatment directed to the general state of the system or to some constitutional diathesis is in a large proportion of cases of the utmost consequence. Radcliffe and Anstie have shown the great advantage of the use of fatty elements when nutrition is impaired, especially cod-liver oil or Devonshire cream. Iron in anæmic subjects; quinine in full doses, especially in malarial neuralgias; arsenic in the form of Fowler's solution; strychnine or nux vomica, are among the most valuable remedies for neuralgia. In some instances valerianate and other salts of zinc, or nitrate of silver prove serviceable. Phosphorus has been found highly beneficial in many cases. Should the neuralgia be associated with gout, rheumatism, syphilis, or the presence of some metallic poison in the system, treatment directed against such a condition is essential. 4. An important class of remedies are those which have a direct sedative effect on the nervous system, including mainly opium or morphia; belladonna; extract of cannabis indica; hydrate of chloral; croton-chloral; bromide of potassium; conium; atropine; tincture of aconite; veratria; and ammonic chloride in full doses. Two comparatively new drugs are said to be very efficacious, viz., eucalyptol, which is an essential oil derived from the *Eucalyptus globulus*; and the tincture of *Gelseminum sempervirens*. These medicines are either given by the mouth; applied to the affected part by means of plasters, liniments, ointments, or tinctures; or, above all, some of them are introduced by subcutaneous injection, particularly morphia and atropine. They are not merely to be used for the temporary relief of pain, but are in many instances most important aids in bringing about a cure, if employed systematically and regularly every day for such a period as the case may require. In using subcutaneous injections, it is best to begin with a very small dose, *e.g.*, gr. $\frac{1}{10}$ – $\frac{1}{6}$th, of morphia, and increase it as occasion requires, some cases needing large quantities after a time. As a rule the injection need not be made at the seat of pain, but Anstie recommends that this should be done in advanced cases where there is much hyperæsthesia, and where there is reason to believe that much thickening and hypertrophy exists about the nerve. If necessary the sensibility may be first blunted by the ether spray. The use of alcohol demands brief notice. There can be no doubt but that the pain in neuralgia may often be temporarily lulled by the use of alcoholic stimulants, but experience has convinced me that we should hesitate in recommending them, as there is in this complaint a strong tendency on the part of the patient to be taking them at frequent intervals and in increasing quantities, so that the foundation may be laid for confirmed habits of intemperance. 5. Certain anodyne local applications have been alluded to above, the most useful being liniment or plaster of belladonna or opium; tincture of aconite; ointment of aconitine or veratria; and a liniment containing eucalyptol. Among other local remedies which may be serviceable are dry heat or heat with moisture; chloroform liniment; sinapisms; flying blisters; and light linear cauterisation. In obstinate cases blistering and even stronger forms of counter-irritation may be required. Cold is useful in some cases, in the form of ice or evaporating lotions, and I have found much benefit from the application of the ether spray over the seat of pain for a few minutes three or four times daily. A most valuable local method of treatment is that by electricity. The constant galvanic current is decidedly the best as a rule, but sometimes faradisation is beneficial, or merely charging the patient from a friction-machine, or afterwards taking a spark from the seat of pain. In employing galvanism it is necessary to use only a very weak current, especially about the head, carefully guarding against giving rise to unpleasant head symptoms; to apply it by well-wetted sponges in the direction of the nerve, the positive pole being placed over the seat of pain: and not to make the application for too long a time, but with frequent repetitions. Surgical interference has been had recourse to in very obstinate cases of neuralgia, the nerve being divided or a piece of it cut out. This treatment is rarely followed by any permanent good results.

It is necessary to make a few additional remarks respecting the treatment of *migraine*. During the premonitory stage of an attack, if this is evident, certain measures may be taken with the view of preventing or mitigating the subsequent headache. The patient should at once retire into a quiet darkened room, and lie down on the side which is usually the seat of pain, with the head low, the extremities being kept warm. Very many remedies have been recommended, but their usefulness probably differs in different cases. The most important are diffusible stimulants, such as a little brandy or sherry and soda-water, champagne, or spirits of ammonia; a cup of simple strong tea or coffee; hydrate of chloral; croton-chloral; tincture of cannabis indica; bromide of potassium; nitrate of ammonium; caffeine, either internally or by subcutaneous injection; and the guarana powder, which consists of the powdered seeds of the *Paulinia sorbilis*. This last drug is given in the dose of 10 to 15 grains, but there is much contradiction in the accounts of different observers as to its efficacy, and in my own experience it has had very different effects. The application of a weak continuous galvanic current is sometimes useful. Anstie recommended a warm foot-bath containing mustard, and to breathe the steam from this at the same time. In some cases I have found the administration of an emetic, such as sulphate of zinc, decidedly beneficial. Much relief often results from tightly binding the head with a wet bandage. Probably the steady application of ice or the cold douche might be serviceable in some cases. During the height of an attack it is best to leave the patient in perfect quiet, and not to give food or anything else. In the intervals many of the measures recommended for neuralgia in general are indicated, and among the most useful medicines are strychnine, arsenic, quinine, and bromide of potassium. Tincture of cannabis indica, ♏ v—x, thrice daily, has been found beneficial by several observers. Tincture of actæa racemosa has been also recommended. It is requisite to attend to the state of the alimentary canal; and to avoid the causes which are likely to give rise to an attack of migraine.

CHAPTER LXXII.

HYSTERIA AND ALLIED AFFECTIONS.

PATHOLOGY AND ETIOLOGY.—Hysteria is a very complex morbid condition, of the nature of which it is impossible to speak definitely. It belongs to the nervous disorders, but its exact seat cannot be localised, though probably the brain is most disturbed. No characteristic pathological change has been discovered, but there is probably a nutritive derangement of the entire nervous system. The attempt to localise the primary disorder in the sympathetic ganglia, and to attribute the phenomena observed to vaso-motor disturbance, has no sufficient foundation.

Hysteria is infinitely *more common* among females, beginning usually from 15 to 18 or 20 years of age, but sometimes much earlier or later, in exceptional cases at the change of life. Young girls, old maids, widows, and childless married women are the most frequent subjects of the complaint, and its manifestations often cease after marriage. Hysterical fits are more common about the menstrual periods. These facts have led many to consider the hysterical condition as being primarily connected with some disturbance of the sexual organs or functions, which affects the nervous system. It has thus been attributed to malpositions of the uterus; undue sexual excitement and unsatisfied desire; sexual excess; and disordered menstruation in the way of menorrhagia, amenorrhœa, or dysmenorrhœa. That uterine and ovarian disturbances do help greatly in exciting hysterical attacks in a large number of instances cannot be doubted, but many eminent authorities deny that these constitute the essence of the complaint. Its frequency in women is due to the inherent conditions of their nervous system, often aggravated by their mode of existence. The system may be disordered by many conditions, but the sexual functions assume an undue prominence in the mind, and thus any disturbance in connection with them produces an exaggerated effect. In many cases of hysteria there is nothing wrong about the generative organs or functions, while it occurs often enough in married women with families. The improvement which frequently takes place after marriage may be accounted for by the change in habits, thoughts, purposes, occupation, and general surroundings which this usually involves.

Hysteria is in some instances distinctly traceable to digestive disturbances, especially long-continued constipation with accumulation of fæces. Causes referable to the mode in which girls are brought up and their general habits of life aid materially in its production, such as want of useful occupation; indolent and luxurious habits; over-petting and spoiling; subjection to the petty worries of fashionable life; keeping late hours at parties; or reading sentimental novels. Temperament and hereditary predisposition to nervous affections may have some influence, but the latter may often be explained by the patient imitating a hysterical mother. In not a few cases hysteria results from depressing influences, such as long-continued anxiety or grief; disappointed affection; over-work with bad feeding and improper hygienic conditions. It may depend upon some definite chronic disease, either local or general. In some instances the condition named hysterical can only be attributed to wickedness and perversity.

The hysterical state is now and then observed in males, but infinitely rarely as actual fit. The subjects of it are usually from 35 to 50 years of age, and its causes are excessive venery or masturbation; over-work with long-continued worry and anxiety; excessive and prolonged mental labour; senile degeneration; or commencing chronic cerebral disease.

The exciting cause of the first hysterical fit is generally some powerful and sudden emotional disturbance, but this may be very slight if the patient has previously been in a state of mental restraint with powerful feelings; or has been subject to depressing influences for a considerable period. Subsequent paroxysms also are liable to arise from a much slighter disturbance than that which brought on the first attack.

pressed laughter may lead to very severe fits. Occasionally they ult from some physical disturbance, as injury; loss of blood; or ne acute illness.

SYMPTOMS.—It is impossible to give even an outline of the varieties clinical phenomena which may be presented in cases of so-called steria. There is scarcely a complaint which may not be simulated. most cases, however, the prominent features are an undue excitability the emotions, with defect in the power of the will and intellect; erations in the general cutaneous sensibility and in the special senses, ually in the direction of hyperæsthesia and dysæsthesia; and a tenncy to involuntary muscular movements or other disturbance of the otor functions. It will be necessary to describe first the characters certain paroxysms or *hysterical fits*, and then point out some of the incipal phenomena which may be noticed in hysterical persons.

Characters of a hysterical fit.—As a rule a fit of hysteria occurs when her persons are present, and never comes on during sleep. The tack is not sudden, but gradually worked up to, the patient generally ving time to place herself in a comfortable position and to adjust her ess; it is often preceded by sighing, sobbing, laughing, moaning, nsensical talking, gesticulation, or a feeling of globus hystericus, but t by any peculiar cry. During the actual fit there may be apparent consciousness, but this is not complete, as can be determined by uching the conjunctiva, while the patient is generally aware of what is ing on around, and looks out from under her eyelids occasionally. asmodic movements are observed, varying from slight twitchings in e limbs to powerful general convulsive movements, or almost tetanic asms. Patients often struggle violently, throw themselves about, ile the thumb is frequently turned in and the hand clenched. uring these movements, which may last only a few moments or for an definite time, with or without intermissions, there is no lividity of the ce or other sign of interference with respiration. Breathing is noisy d irregular, while gurgling and spluttering sounds are frequently oduced in the throat and mouth. The pupils are not dilated; in any cases slight internal strabismus is observed, and the eyes are rned up from time to time. The pulse is normal. There is no biting the tongue, and rarely any foaming at the mouth. The paroxysm nerally terminates with crying, laughing, sighing or yawning, and is llowed by a feeling of exhaustion, but not usually by coma; though in re instances the patient falls into a kind of prolonged trance. Freuently abundant eructations of gas take place, and there is often a pious discharge of pale watery urine. Rarely an attack is followed by state of hysterical mania, in which the patient is not responsible for r actions.

The hysterical state.—The chief deviations which so-called hysterical tients may present may be considered as they affect the mental, nsory, and motor functions.

a. Mental. There is defect of will and mental power, while the notional functions are not under proper control, being very readily cited, and tending to lead to exaggerated actions. Some patients say ey cannot perform various acts, such as standing, walking, or speaking, hich they do perfectly well when they forget themselves. Frequently the spirits fluctuate very rapidly and without cause, from morbid cheerfulness to despondency, and the hysterical patient sobs, sighs, cries, or laughs without adequate reason. Ideation and thought may be over-active in some respects, but the general intellectual vigour is much impaired. Many hysterical patients talk a great deal of nonsense. They have an exaggerated self-importance; seek attention from others; and are as a rule never so pleased as when they become objects of attraction or sympathy, or are creating a sensation, which accounts for "fasting-girls," trances, some cases of somnambulism, and similar conditions. Many are very restless, irritable, and impatient. Others, however, seem simply indifferent to all around, and remain melancholy, silent, motionless, and apathetic for long periods together, caring nothing about dress or anything else. In some cases a form of mania sets in. Hysterical patients are strongly disposed to take to drinking in excess.

b. Sensory. Commonly a condition of general exaggerated sensibility, hyperæsthesia, or nervousness exists, both as regards cutaneous sensation and the special senses, an unusually slight stimulus being recognised or producing an undue effect. Further, there is often a condition of dysæsthesia or painful sensation from slight irritation. This is evidenced chiefly by cutaneous tenderness in certain parts, sometimes intense, especially in the left side; along some part or the whole of the spine, slight pressure over which will often cause severe pains to shoot to distant parts; around the joints; and over the abdomen. The tenderness is greatly diminished by taking off the patient's attention, and it is very superficial, signs of suffering being elicited by a slight touch or a pinch of the skin, but not when steady and firm pressure is made, or when a joint is rudely jogged. Dysæsthesia from slight stimuli may also be evinced in connection with the special senses. Spontaneous pains are commonly complained of in various parts, of a more or less neuralgic character, frequently described as very intense, and being especially seated at the top or back of the head, here often assuming the characters of clavus hystericus; in the left side; along the back; over the sacrum or coccyx; and in the joints. Paræsthesiæ, such as formication, numbness, tingling, flashes of light, tinnitus aurium, or a peculiar smell or taste are also common. A curious sensation often complained of is that named *globus hystericus*, which is a feeling of constriction or of a "ball in the throat," either fixed there and giving the sensation of choking, the patient making all kinds of ineffectual efforts to get rid of it, or ascending upwards from the epigastrium or even lower than this. In exceptional cases hypæsthesia or even complete anæsthesia of the skin and deeper structures, or of the special senses is observed. Cutaneous anæsthesia is generally limited in extent and irregular in distribution, but may be hemiplegic or paraplegic. The temperature is occasionally reduced. The bladder or rectum may be affected, leading to great accumulation of urine or fæces, of which the patient is not aware.

c. Motor. Voluntary movements are generally defective, and the power of the will over the muscles is weakened, while all kinds of involuntary movements are exaggerated and very readily excited, viz., those due to emotions, ideas, sensations, reflex irritation, and organic causes. The hysterical patient starts suddenly from any slight dis-

ushes about under the influence of some notion or other, and
us other silly acts. Spasmodic movements or fixed rigi-
erent muscles are not uncommonly observed independently
ysteria, while cramps are very common, as well as spasms of
gans. Occasionally some form of motor paralysis is noticed;
follows a hysterical paroxysm, and is limited to one limb or
to a part of it, but it may be more or less hemiplegic, para-
ven general in its distribution. As a rule sensation is not
t the same time; the paralysis is incomplete; nutrition is
npaired, or only slightly after long duration of the paralysis;
ric irritability is usually unaffected, though electric sensibility
ssened, and now and then both are diminished or lost.
rigid flexion of one or more joints is observed, difficult to
which is evidently partly due to voluntary opposition by the
l when it is overcome the limb rapidly assumes its former po-
etimes flying back with a sudden spring or jerk. Hysteri-
s is liable to rapid changes and may cease suddenly. Under
it completely disappears and power is restored. The im-
gnostic marks of hysterical hemiplegia are that it is usually
; that the tongue and face are rarely involved, though there
sis; that the manner of walking is different from that of
legia, there being merely a dragging of the leg without any
novement, while the toes are raised; and when the patient
bend forwards the arm is held back. In paraplegia also the
rarely complete, and one leg is more affected, generally the
nent of the limbs can often be readily performed in the recum-
re, but when an attempt is made to walk, the patient being
ted on either side, all power and control over the muscles
gone, and she falls if the support is removed, but generally
o recover herself suddenly when near the ground. The
nd rectum are usually unaffected. Aphonia is a frequent
n hysterical patients, resulting from laryngeal paralysis. Here
alteration in the quality of the voice as a rule, but it becomes
sper, and if the patient is asked to make an effort to speak,
ower of whispering may be lost. This aphonia often comes
sappears with remarkable suddenness, especially under the
f some strong emotion. Some hysterical patients refuse even
to speak. A curious enlargement of the abdomen is observed
constituting the so-called "phantom tumour." This region
symmetrical prominence in front, often of large size, with
ion below the margin of the thorax and above the pubes.
ement is quite smooth and uniform; soft; very mobile as a
side to side; somewhat resonant but variable on percussion;
inful. Vaginal examination gives negative results; and under
the prominence immediately subsides, returning again as the
ains consciousness.

sterical patients are out of health, many of them being weak
ic. Among the numerous symptoms complained of are:—
e disturbances, especially flatulence; borborygmi; copious
; cardialgia; depraved appetite and fulness after food; obsti-
pation; *intestinal colic or gastralgia*. *b.* Circulatory disorders,

The exact grouping of the phenomena describ
able in different cases, and also in the same case
The hysterical state may be permanent; or it onl
vals with more or less intensity.

It will be convenient here just to allude to cer
phenomena occasionally observed. 1. *Catalepsy*
the will seems to be cut off from certain muscles, a
the affected part is placed in, *e.g.*, a limb, it will
an indefinite time. It may or may not be ac
consciousness. Sensation is usually much impair
This condition is sometimes associated with or
brain; or severe organic visceral disease. 2. *Tr*
vidual lies as if dead, being ghastly pale, circul
having almost ceased. Persons in a trance have
as dead. 3. *Ecstasy.*—The patient pretends to se
is combined with ridiculous dancing movements,
by certain religious communities.

DIAGNOSIS.—Attention to the characters descri
a hysterical paroxysm, and the circumstances unde
enable it to be distinguished from epileptic and al
In women hysteria should always be borne in
many of the ailments of which they complain.
important affections which it may simulate are dise
spinal cord; disease of the spinal column; pe
tumours; laryngitis; and diseases of joints.
hysteria; absence of pyrexia or of the charact
longing to the several affections; peculiar supe
pain or tenderness present; characters of the differ
as already described; and effects of the administ
will generally enable a satisfactory conclusion to be

TREATMENT.—1. *Of a hysterical fit.*—But little i *he hysterical state.*—The management of persistent and confirmed often very difficult. Mental and moral guidance is most im- nd the patient should be taught to look away from herself and nces, and to engage in some useful occupation. Any injurious t be rectified. Change of scene and associations, with travel- ften very serviceable. Any cause of discomfort at home or should be removed, if possible. General treatment directed te of the system and blood is often most beneficial; attention paid to diet and to the state of the digestive organs. On no hould hysterical patients be encouraged to take alcoholic . Various symptoms often call for interference. Pains in arts are best relieved by belladonna or opium plasters or lini- at about the joints by warm poultices or fomentations sprinkled num. Hypodermic injection of morphia may be required. ssness and sleeplessness bromide of potassium is the best Paralysis must be treated by electricity; and rigidity counter- ixing the limbs in other positions by means of splints or other l apparatus, and by passive movements. If necessary chloro- be used; this may also be employed to get rid of a "phantom I have often found aphonia cured by applying a small blister larynx, or even a strip of belladonna plaster, these probably ough the mind. In obstinate cases the vocal cords may be , or the patient charged with franklinic electricity and sparks n from over the larynx. It is questionable how far such assafœtida and valerian are useful in hysteria, when used as of cure, except in being very disagreeable; they are valuable, s antispasmodics.

CHAPTER LXXIV.

HYPOCHONDRIASIS.

—The affection thus named is in reality merely a mental characterised by inordinate attention on the part of the pa- is own real or supposed bodily ailments and sensations. es of the better class who have no occupation are the usual f the complaint, but it is not uncommon to meet with it rking men in out-patient hospital practice.

MS.—As a rule some actual disease sets up the hypochondriacal inally, especially digestive or biliary disorders; venereal r some acute illness. In other instances the symptoms are ginary. The precise symptoms complained of vary much, re liable to change from time to time, or new phenomena are r which the hypochondriac is ever on the look-out. These nerally present a healthy appearance, and sleep and perform nary functions satisfactorily. They go the round of the " if they *can afford it;* take any amount of physic, which

friends are unaltered. These cases are always ve
and frequently quite incurable. Ultimately they
misanthropes, and exclude themselves from all so

Treatment.—The main thing in treating hyp
practitioner to try to acquire some control over th
believe in him, by investigating their case prope
he takes an interest in and thoroughly understa
be talked out of their ailments, but kind argumen
and they should be urged to take their attentio
mingle in society, travel, or otherwise occupy t
must be paid to bathing, exercise, and other
the general health. The diet and state of the di
also be regulated. As to medicines, something
administered, and the best plan is just to treat the
taking care not to give anything that can do harm.
send hypochondriacs to hydropathic institutions
on account of the change they experience and the

Chapter LXXV.

EPILEPSY—FALLING SICK

Etiology and Pathology.—Epileptiform seizu
in connection with various organic diseases of t
branes, *e.g.*, meningitis, hydrocephalus, tumour,
syphilitic disease; in different conditions of the
which lead to pressure upon or irritation of this

er theory a sudden discharge of nerve-force takes place from nse number of nerve-cells at the beginning of a fit, which leads . The remote causes to which epilepsy has been attributed Mental disturbance, especially emotional, *e.g.*, sudden fright, d grief or anxiety; also excessive mental work, and undue forcing ain in childhood. 2. Physical influences affecting the brain, as r fall on the head, or sunstroke. 3. Certain conditions affect-tate of the blood and general system, such as syphilis, rheu-gout, acute specific diseases, pneumonia, pregnancy. 4. Reflex , as from dentition, worms, uterine and ovarian disturbances, xcesses and masturbation. Great prominence has been given observers to the sexual functions as a cause of epilepsy. ditary taint. Undoubtedly this has an important influence in ation of epilepsy, especially when it comes from the mother's n a considerable proportion of cases either epilepsy or some eurosis is prevalent in the family. Probably intemperance in nts, syphilis, or a fright to the mother while the child is in ay be the means of inducing a congenital tendency to epilepsy. mplaint is developed at an earlier age in hereditary cases. athic. This term applies to cases in which no obvious cause nade out. Age requires special notice as a *predisposing cause.* great majority of cases epilepsy is developed between 10 and of age, and especially at or about the period of puberty. s not seem to have any particular influence. It rarely happens immediate exciting cause of a fit can be made out.

TOMS.—Attacks of epilepsy assume one of two forms, of each it will be necessary to describe the typical characters.

ilepsia mitior—Petit mal.—This form is characterised by sudden plete loss of consciousness, coming on without any warning, ing only for an instant, or at most for a few seconds; accom-ith slight pallor and subsequent duskiness of the face; loss of ssion; dilated pupils; and often, but not always, slight spas-ovements affecting the face, respiratory muscles, or limbs. dividual is speaking, he stops in the middle of a sentence, and y appears to hold his breath. Voluntary movements cease, matic actions go on as a rule, *e.g.*, such as are necessary for , sitting, or riding. In some cases there is not absolute un-sness, and there may be but a feeling of sudden vertigo—*pileptique*—which causes the patient to cling to the nearest After the attack there is some degree of mental confusion, ut a few minutes, during which the patient says and does things e afterwards forgets and denies. There may be a little squinting ing of choking. On recovery there is no recollection of what ened: These attacks may be preceded by an "aura epileptica," y may be premonitory of severe epileptic seizures, or occur in e subjects. They are frequently followed by serious mental , ending in dementia or mania.

ilepsia gravior—Haut mal.—The advent of a fit of epilepsy is ge proportion of cases indicated by premonitory symptoms, in duration from an instant to several hours or days. They great variety, being either subjective or objective, and com-

from the elbow to the shoulder, or from the leg t
has been stated to pass from the testicle or uter
sensation varies in exact character, but has been
of cold or hot air, and is frequently not unpleasa
its ascent may sometimes be stopped and the fit
which need not be sufficient to stop the circulati
will happen when the pressure is applied to the c

Actual attack.—Three marked stages character

Stage I.—The phenomena of this stage are
agreeable cry, yell, or moan in many cases, but n
followed by absolute and instantaneous loss
patient falling anywhere, or often appearing a
violent tonic spasm of the muscles throughout
generally about the face and neck, the whole mu
a state of extreme rigidity and strain, but not
there is a hideous distortion of the features, limb
being drawn to one side, and the neck twisted s
over one shoulder, while the teeth are firmly c
open, and the eyeballs turned up or in : stoppage
complete, owing to the spasm of the muscles ; ch
face almost invariably, in many cases deadly pa
first, followed by duskiness or lividity, or this m
commencement, or be preceded by florid or dull
tation of the pupils; feebleness or cessation of
due to the muscular spasm, for the heart acts fo
throb violently. Practically these phenomena
simultaneous, the whole stage not lasting longer
to thirty or forty seconds.

Stage II.—The transition to this stage is abrup
restoration of breathing, the respiratory muscles
the retained air being expelled. Unconsciousness

ımb pressed into the palm; alternate dilatation and contraction of : pupils; laboured, panting, and irregularly convulsive respiratory vements, often attended with sounds due to mucus in the trachea; reasing duskiness or lividity and turgidity of the face, tongue, and dy generally, with distension of the veins, some of the smaller vessels metimes giving way, thus giving rise to extensive petechiæ about the e or head; profuse perspiration, the sweat being sometimes peculiarly tid; tumultuous action of the heart, with throbbing of the large arteries, ough the radial pulse is often weak: involuntary discharge of urine, ces, or semen; and frequently rumbling noises in the intestines, miting, or hiccup. The average duration is said to be from 4½ to ¼ minutes, but it may vary from a few seconds to 10 minutes. The nic spasms are believed to be the result of the stoppage of respiration the previous stage, with consequent asphyxia.

Stage III.—There is a gradual return of consciousness, with cessa- n of the spasmodic movements. The patient looks around with a wildered, alarmed, or sad expression, and often attempts to get up or speak, but some few minutes usually elapse before consciousness is mpletely restored. The heart still acts vigorously, and the skin is thed in sweat. Vomiting often takes place. A large quantity of le and watery urine may be passed, containing excess of urea and ites, or sometimes of phosphates, and it is said that a trace of sugar s been found after a severe fit. After return to consciousness the tient is usually very exhausted and sleepy, as well as mentally con- ed, and complains of headache. In many cases, but by no means all, he falls into a state of heavy sleep or stupor, almost amounting coma, attended with a stertorous noise in breathing, from which it is ficult or impossible to rouse him, and which lasts for a variable time, netimes passing into natural sleep. The muscles are relaxed, but sent occasional twitchings or slight spasmodic movements. The face nerally remains more or less dusky for some time, and the petechiæ ntinue visible. The patient is often languid and out of sorts for ne days after a fit.

The frequency and severity of the fits vary much in different cases. a good many a tolerably marked periodicity is observed. In few tances does the interval extend beyond a month. The seizures are re frequent as a rule in severe cases, and they tend to increase in th these respects as they advance. Not uncommonly two or more occur in succession, followed by a period of freedom from attacks. ey are liable to come by night as well as by day.

The general state of the patient also differs considerably. There is ely perfect health, especially after epilepsy has existed for some ne. Many epileptic patients suffer from headache or giddiness and rious other symptoms, the general system and digestive organs being o out of condition. The mental faculties become more or less akened in most cases, and this may end in complete dementia or ngerous mania. Sometimes partial and limited paralysis, twitchings, rious movements, alterations in sensation or in the special senses, d other nervous phenomena are observed. As complications of ileptic fits, coma from injury to the head, apoplexy, or meningitis y arise.

DIAGNOSIS.—The chief conditions from which a true epileptic seizure may have to be distinguished are hysteria; reflex convulsions; epileptiform attacks due to cerebral organic diseases, uræmia, or chronic alcoholism; syncope; and feigned epilepsy. Some of these will be alluded to in a future chapter.

PROGNOSIS.—A cautious opinion should always be given in epilepsy as to the final issue. Very rarely does a fit end fatally, but this might happen from complications. As to the curability or improvement of the disease, the favourable prognostic circumstances are that the disease is recent, or due to some definite cause which can be removed; the patient being very young and a male; absence of hereditary taint; the mind being unaffected; and the fits being frequent. The mental faculties are more liable to become affected in females; in persons who are strong and healthy; when the disease begins late in life; when the fits occur in rapid succession, with attacks of "petit mal;" and, it is said, when the spasms are not marked during the fit, and there is little or no subsequent coma.

TREATMENT.—1. *During a fit.*—It is best not to interfere actively in most cases, merely attending to the matters mentioned when speaking of convulsions in general, preventing injury, but not holding the patient forcibly, and putting something between the teeth. If the fit does not soon cease, water may be dashed over the face and chest, and should it be dangerously prolonged, such measures might be had recourse to as application of sinapisms to various parts; a warm bath, with cold affusion while in it; ice to the spine or head; stimulant enemata; electricity; local removal of blood from about the head; or even venesection if there is great danger of asphyxia. After a fit the patient should be placed in a comfortable position, kept quiet, and allowed to sleep.

2. *In the intervals.*—There are certain principles to be followed in the management of an epileptic patient. *a.* It is requisite to look for and remove any local cause of irritation, such as a foreign body irritating a nerve, or worms. Further, as epilepsy may depend on some central organic mischief, careful investigation is required in order, if possible, to find out and treat any such disease, especially if due to syphilis. Any constitutional condition, as rickets or tuberculosis, must be attended to. *b.* The general management of an epileptic is highly important. He should have a nutritious but light and digestible diet; take moderate daily exercise in the open air; be surrounded by proper hygienic conditions; avoid much mental work, especially in the case of children, who should be kept from school, though if the general health is good, older patients may follow some light occupation; have cold or tepid sponging daily, with friction afterwards; check any vicious habit, such as excessive venery, masturbation, or intemperance; and take a sufficient amount of sleep, the head being well raised at night. It is necessary to regulate the digestive functions, especially avoiding constipation, but only using mild aperients. Iron if there is anæmia, quinine, strychnine, and other tonics are often of service. Many epileptics require constant watching, and all need more or less supervision, above all not being allowed to go into positions where they would be in danger from falling, or near a fire or water. Epileptics decidedly ought not to marry.

pecific treatment.—Innumerable specifics have been brought for-
r the cure of epilepsy. Of these the only drugs that deserve
mention are bromides, especially bromide of potassium; bella-
or atropine; stramonium; conium; extract or tincture of
is indica; preparations of zinc, especially the oxide, sulphate in
lly increasing doses up to 10, 15, 20, or more grains thrice daily,
nate, and acetate; nitrate of silver in minute doses; opium in
quantities; and chloroform inhalation, not to induce complete
bility, either systematically employed at certain intervals daily,
administered when there are signs of an impending fit. Doubt-
these may prove serviceable in different cases, and sometimes
ay be usefully combined, as belladonna with sulphate of zinc.
le of potassium has been found eminently beneficial when given
s of gr. v—xxx or more thrice daily, on an empty stomach. It
always lessens the number of fits; often keeps them off entirely,
the dose has generally to be gradually increased in order to
plish this end; and sometimes a complete cure is effected by its
The bromide is found to be particularly useful when the attacks
iefly or entirely of the "haut mal" type; when they are very
t; and when they occur mainly by day. Dr. Chapman treats
y by constant application of ice to the spine. In obstinate cases
emoval of blood from the back of the neck, with counter-irritation
ters, setons, or issues has been recommended. The treatment
epsy by clitoridectomy, castration, circumcision, and such methods
nly be mentioned to be condemned.

CHAPTER LXXVI.

CHOREA—ST. VITUS'S DANCE.

OGY AND PATHOLOGY.—Many views have been advanced as to
ature of chorea, but it will not serve any practical purpose to
to them all.

characteristic morbid appearances have yet been acknowledged.
aluable communication recently read before the Medico-Chirurgical
y by Dr. Dickinson, the morbid appearances observed in several
ases were described as widely-spread, symmetrical hyperæmia and
nsequences, affecting the nervous centres, but especially the ganglia
base of the brain and the spinal cord, particularly the upper part
latter and the posterior and lateral portions of its grey matter.
yperæmia was most marked in the arteries, and its effects became
ent according to the duration of the disease, viz., hæmorrhages,
terial exudations and degenerations, and spots of sclerosis in
ic cases. To this increased vascularity and its consequences
ickinson would attribute the phenomena of chorea, localising the
bance chiefly in the spinal cord. He considers it as mainly pro-

duced by causes belonging to two classes, viz., the rheumatic condition; and various kinds of irritation, mental and reflex, in connection with the nervous system. He regards the lesions as points of irritation, calculated to excite nervous functions unduly, and thus to lead to muscular excitement.

A theory which was first started by Kirkes, and which is supported by H. Jackson, Broadbent, and others, attributes chorea to minute emboli, which are conveyed from deposits on the valves of the heart and become lodged in the small vessels of the convolutions near the corpora striata and optic thalami; or in these centres themselves and other neighbouring parts of the brain. Broadbent localises the mischief in the corpora striata; Jackson in the adjoining convolutions. Bastian regards the plugs as of the nature of thrombi, and as formed of accumulations of white corpuscles. As a consequence there is impaired nutrition of the affected nerve-centres, leading to disturbance but not complete abolition of their functions. The embolic theory is believed especially to apply to those cases in which chorea accompanies acute rheumatism. When this disease attacks the young choreic symptoms are very liable to arise. Occasionally also there are signs of endocarditis or pericarditis along with chorea and high temperature, but no joint-symptoms. It is highly probable, however, that the derangement of the vascular supply and of the nutrition of the nerve ganglia which leads to chorea may result from other causes besides embolism, such as slight local disease or hæmorrhage; disease of the vessels; mental shock; reflex irritation conveyed from some distant part; or an impure state of the blood. Some believe that chorea is due to a certain definite change in the blood, and that the complaint is allied to the acute specific diseases. In many cases anæmia is observed. Apart from rheumatic fever, by far the most frequent *exciting cause* of chorea is sudden fright, especially when acting on a child previously weak and anæmic. The complaint may, however, arise from other forms of emotional disturbance, or from imitation when children associate with others who are suffering from it; injury to the head or to some local nerve; reflex irritation connected with worms; painful second dentition; masturbation menstrual derangements; or pregnancy. Frequently no obvious cause can be made out, except the condition of the blood and general system

There are some important *predisposing causes* of chorea, viz., the female sex; early age, especially from 5 to 15; hereditary tendenc to various neuroses; bad living and unfavourable hygienic conditions with consequent imperfect nutrition; a recent attack of some acut lowering illness; and a damp and cold climate. Anomalous choreiform movements may occur at any period of life in connection with variou organic cerebral diseases. Certain movements observed in childre and also in adults, are merely the result of habit, such as frequen closure of the eyelids or twitching of the mouth.

SYMPTOMS.—Chorea is characterised by peculiar persistent involuntary movements of various muscles, partaking of the character of cloni spasms; with loss of control over voluntary actions, the will appearin to have its influence over the muscles diminished, while co-ordinatin power is impaired. The complaint generally runs a definite cours though of variable duration, the symptoms setting in gradually; reach ing their height in about two or three weeks, at which they remain for a variable time ; and then subsiding. Sometimes, however, it remains as a chronic condition. The first signs which attract notice are that the patient seems restless and fidgety, cannot keep quiet, jerks one of the limbs about occasionally, halts or drags one of the legs in walking, makes grimaces, performs various acts awkwardly, or drops and breaks things. The phenomena of the established disease are very characteristic. The term "insanity of the muscles" has been well applied to the absurd, disorderly, involuntary movements which are observed. As rule they are moderate in intensity and not painful ; they exhibit great ariety in combination, and are not mere jerks of the muscles, but more ke restless movements, indicating complex co-ordinations, and often onveying an idea of purpose or design. The head is moved about in arious directions; the face exhibits all sorts of ridiculous smiles, owns, and grimaces ; the tongue is often thrust out and coiled and en withdrawn again, or pushed into the cheek, or drawn into the roat, as if an attempt were being made to swallow it. The shoulders are rked up, and the arms thrown about, while various fidgety movements re carried on with the hands and fingers. The legs are frequently unffected, being always much less disturbed than the arms. Respiratory ovements are infrequent, jerky, and irregular, the natural relations of e abdominal and thoracic movements being perverted during breathg ; sometimes there is a dry nervous cough or grunting sound. It does ot often happen that the muscles of the trunk seem to be much affected, ut choreic patients are usually unable to sit or lie quietly for any time. he muscles of the larynx are rarely implicated, those of the pharynx ever. Very commonly these involuntary movements commence and re more marked on one side than the other ; or they may be entirely nilateral—*hemichorea*, or even confined to one limb. They are much tensified by attention being directed to them, as well as under the inuence of emotion. A strong effort of the will or a deep inspiration may mporarily control them, but they become worse afterwards. During eep they cease, but may be excited under the influence of dreams.

The want of control over the voluntary movements is seen in every act hich the patient performs, such as walking, holding out the hand, putting nything to the mouth, eating or drinking, smiling, attempting to take old of or carry any object, which is generally allowed to fall or is rown down. Articulation is commonly indistinct and jerky. Mictution may be difficult, on account of the jerking of certain muscles. The phincters are never affected. The muscles are in a state of decided eakness, amounting to slight paralysis. A sense of fatigue and nervous xhaustion is usually experienced ; while aching in the limbs, headache, nd pains in the back are often complained of. The expression seems point to some degree of mental defect, but this is mainly due to the ovements of the muscles, though in many cases, especially if of long uration, the intellectual faculties become somewhat obscured.

The general health is almost always below par, anæmia being often prominent feature. Temperature is normal, unless the chorea is sociated with some pyrexial condition. The digestive organs are out order in many cases. The urine is at first usually concentrated ; ntains excess of urea ; frequently deposits urates abundantly, as well as oxalates and phosphates sometimes. The state of the heart requires special consideration. In all cases of chorea it is desirable to examine this organ every day if practicable. A basic anæmic murmur may be heard, but it is a mitral regurgitant murmur which must be specially looked for. This may be inorganic, resulting from irregular muscular action; or organic, associated with valvular lesion. The former is distinguished by its being usually not very loud or harsh, though it may be very well-marked; frequently by its irregularity, being heard at one time and not at another; and by its disappearance as the patient improves. An organic murmur is in many instances evidently connected with an attack of rheumatic endocarditis, but it is important to remember that this may be set up in cases where there is no obvious implication of the joints. Dr. Dickinson has advanced the opinion that endocarditis may be the consequence of chorea, being brought about by the irregular action of the heart.

Cases of chorea are occasionally met with in which the symptoms present an extremely acute and virulent character, the spasmodic movements being excessively violent and constant, and extending throughout the body. The patient is unable to swallow or perform any voluntary act, and is greatly distressed and exhausted, sleep being impossible. Death ensues if the movements do not abate, often preceded by adynamic symptoms, delirium, or coma, but the intellect may be almost clear to the last. Two such fatal cases, occurring in girls about the period of puberty, have come under my notice, and similar attacks have been observed in connection with parturition.

Diagnosis.—The symptoms of well-marked chorea are so characteristic, that it is scarcely possible to make a mistake in diagnosis, and therefore no special remarks need be made on this subject.

Prognosis.—Chorea almost always terminates in recovery, except in the severe form alluded to above. No definite opinion as to duration should be given. The circumstances favourable to a speedy recovery are that the disease is due to some condition which is amenable to treatment; that this is commenced at an early period; and that the patient can be placed under proper sanitary conditions. The danger of the development of the cardiac complication should always be borne in mind. Chorea increases the danger from acute rheumatism.

Treatment.—It is difficult to estimate the value of remedies in the treatment of chorea, as the complaint so often tends towards spontaneous cure. The indications which should be first attended to are:—1. To get rid of any obvious cause of reflex disturbance. 2. To regulate carefully the diet and the state of the digestive organs, especially maintaining a free action of the bowels. 3. To improve the general health and condition of the blood by nutritious food; proper hygienic conditions; change of air; cold or tepid bathing or the douche, especially over the back, with friction afterwards; and the administration of some preparation of iron, particularly if the patient is anæmic. Many cases do remarkably well under the use of ferruginous preparations, especially the sesquioxide, tincture of sesquichloride, ammonio-citrate, or carbonate. A great many specifics have been introduced for the cure of chorea, the chief including salts of zinc; liquor arsenicalis; tincture of belladonna; conium juice; hydrate of chloral; tincture of cannabis indica; hypophosphites; Calabar bean in the form of powder, extract, or tincture; a combination of morphia with strychnia; or chloroform inhalation twice or thrice daily. From personal experience I do not think that any one of these remedies is applicable to all cases, but one or other may be found of service in different instances. The application of ice to the spine; the passage of a slight constant galvanic current along this region; and subcutaneous injection of curare, are other special modes of treatment which have been advocated. The movements may often be diminished by proper discipline and gymnastic exercises. When the disease is seen in its very early stage, some believe that they can check its course by exciting a free action of the skin by means of warm or hot-air baths, followed by saline medicines or small doses of tartar emetic. Others employ emetics at the outset. Should sleep be much disturbed, some narcotic must be given. If the movements are very severe, it will be well to let the patient sleep on an air- or water-bed. Chorea complicating acute rheumatism usually needs no special treatment. Those dangerous cases in which the movements are extremely violent are but little amenable to any treatment. Inhalation of chloroform; subcutaneous injection of morphia, or perhaps of curare; and supporting the patient, by enemata if necessary, seem to me the most reliable measures.

CHAPTER LXXVII.

TETANUS—LOCK-JAW.

ETIOLOGY AND PATHOLOGY.—Though almost always of *traumatic* origin, and therefore occurring in surgical practice, a brief description of tetanus is needed in this work, as it occasionally comes under the notice of the physician as an *idiopathic* affection, resulting from a person being exposed to cold or wet, sleeping on damp ground, or becoming chilled when perspiring; or attacking infants soon after birth. It is probably a functional disorder of the spinal cord, dependent upon peripheral nerve-irritation, which leads to reflex disturbance. Certain morbid appearances have been described in the cord, but they cannot in the present state of knowledge be said to be at all characteristic.

SYMPTOMS.—The peculiar features of tetanus are persistent tonic spasm or rigidity of the muscles; with extremely painful paroxysms of cramps occurring at intervals. The patient first complains generally of pain and stiffness behind the neck, which increases until the muscles become fixed, the head being drawn back. Then trismus or lock-jaw sets in, and swallowing becomes difficult. Next the rigidity extends to the muscles of the trunk; and finally may involve all the voluntary muscles, except those of the hands, eye-balls, and tongue. They feel hard, tense, knotted, and rigid. The body is generally curved backwards (*opisthotonos*), but may be rigidly stretched out (*orthotonos*), bent forward (*emprosthotonos*), or laterally (*pleurosthotonos*). A very painful feeling of constriction is experienced in the epigastrium, shooting to the back. Soon paroxysms of painful spasms commence, at first slight and occurring at long intervals, but becoming rapidly more frequent, intense, and prolonged, so that they are excited by any slight disturbance, such as a touch or a noise, or come on spontaneously, at last being almost constant. During these fits the patient experiences great distress and suffering; the muscles stand out and become extremely hard, and the back is often so curved that only the head and heels touch the bed; the countenance presents the "risus sardonicus," and has a peculiar aged expression, combined with that of anguish. Breathing is stopped, owing to the fixation of the respiratory muscles, this causing an extreme feeling of oppression and impending suffocation, but the act is comparatively free in the intervals. The voice is weak. During the attacks there is much heat and sweating, and the pulse is very frequent and small. Soon it becomes impossible for the patient to swallow anything, though often very hungry and thirsty, while the mouth is clogged with viscid mucus. Sleep is entirely prevented. There are no head-symptoms, and the intellect remains undisturbed. The pupils are dilated. Cutaneous sensation is not affected, but there is increased reflex excitability. The power over the sphincters is retained; constipation is generally present; and micturition is often difficult. Death is a very frequent termination, either from sudden or gradual apnœa; asthenia from exhaustion and want of support; or both causes combined. The temperature in many cases rises to a very high degree before death, and continues to ascend after death. Recovery occasionally takes place, but convalescence is very slow. Temporary remissions not uncommonly occur, which are apt to mislead as to the ultimate issue. Tetanus now and then assumes a somewhat chronic course. It is usually less acute in its progress when idiopathic than when traumatic.

DIAGNOSIS.—Strychnine-poisoning is the chief condition with which tetanus is likely to be confounded; for the distinctions reference must be made to toxicological works. It might possibly be mistaken for hydrophobia; acute spinal meningitis; or certain cases of hysteria.

PROGNOSIS is extremely grave, as may be gathered from what has been previously stated, but the disease is not necessarily fatal.

TREATMENT.—The only measures which seem to me of any service in idiopathic tetanus are to use warm, vapour, or hot-air baths freely; to administer subcutaneous injections, either of morphia, curare, or nicotine; to relieve the spasms by inhalation of chloroform; and to support the patient by liquid nourishment and stimulants, administered in the form of enemata when they cannot be swallowed. All sources of disturbance must be removed, and the patient kept perfectly quiet. Ice to the spine has been recommended, but in one case which came under my observation no good effects whatever resulted from its employment.

CHAPTER LXXVIII.

ALCOHOLISM.

ETIOLOGY.—The injurious effects upon the system of alcoholic abuse are but too well known. They are the result of its direct irritant action; its influence on the vaso-motor nerves; the circulation of its own poisonous elements, or those derived from its decomposition, through the various organs and tissues; and its interference with tissue-metamorphosis, oxygenation, and nutrition. The exact effects will depend on the nature, quantity, and strength of the stimulant indulged in. Spirits do by far the greatest harm, especially when taken in frequent drams, strong, and on an empty stomach. Alcoholism is most frequent in males; and in those who from their occupation are exposed to intemperance, as draymen, potmen, or cabmen, or whose calling is a lonely or sedentary one. It is also predisposed to by various conditions which depress the nervous energy, such as working or sleeping in a hot vitiated atmosphere; excessive mental work; anxiety or worry; or excessive venery. Persons who suffer severe pain and hysterical individuals are very likely subjects to drink to excess. In not a few instances there seems to be a hereditary tendency to alcoholism, or to some neurosis, such as epilepsy or mania.

SYMPTOMS.—Cases of alcoholism may be included under the following groups:—1. Acute alcoholic poisoning, the symptoms being those of narcotic poisoning. 2. Delirium tremens. 3. Chronic alcoholism. 4. Acute mania, in which the patient is extremely violent and dangerous and has a fixed delusion. 5. Acute melancholia, with suicidal tendency. 6. Oinomania, where there is a constant craving for drink, which breaks out at intervals into an uncontrollable propensity, the moral sense being entirely dead, so that the subjects of this condition will do anything to obtain drink. Only delirium tremens and chronic alcoholism can be specially considered here.

DELIRIUM TREMENS.—This condition may come on under the following circumstances:—1. From mere excessive drinking in a temperate person. 2. An individal who is accustomed to drink freely gets very drunk. 3. A habitual tippler who, without being actually drunk, is always more or less fuddled from saturation with alcohol, experiences some slight disturbance, especially of traumatic kind; or delirium tremens may arise in such persons even without any apparent cause. 4. From deprivation of proper food, with moderate indulgence in stimulants. 5. In consequence of suddenly cutting off stimulants from an individual who has been accustomed to drink freely, especially if old or debilitated. 6. As the result of inhalation of fumes from a distillery, it is said (?). Most cases of delirium tremens follow abuse of spirits.

Generally there are premonitory indications, especially disturbed sleep or absolute insomnia; general discomfort and feebleness; agitation and tremulousness; mental confusion and inability to fix the attention; timidity and lowness of spirits. The alimentary canal is commonly

nations usually exist, the patient fancying he see
objects and sounds, often of a hideous character
imagination what he does see and hear into strang
and noises. These delusions are generally transi
but occasionally the patient fixes upon one an
Further, the mental condition is one of combine
cowardice, sense of dread, and suspicion. The pa
wandering expression, and looks upon everybod
and distrust, imagining that they are trying to
injure him; or fears lest he may do an injury to hi
sense of alarm as to what is going to happen.
culminate in fits of violent mania, attended wit
effort and a wild expression, the patient trying to
to jump out of the window, or do various other
escaping from some imaginary enemy. There is
with reference to the head. Creeping sensation
other paræsthesiæ are common, and the patient of
feels horrible insects crawling over him. The
connected with the muscular system are restless
general tremors, the latter being especially observ
tongue. After fits of violence the patient is much
trated. The pupils are generally dilated and slugg

The important extrinsic symptoms are profuse
fever, the sweat having often a very disagreeable s
moist and clammy, especially that of the palms, or
a weak, large and soft, or small and frequent pulse
tracing often exhibiting marked dicrotism; and di
tary canal, as indicated by foulness of the mouth a
covered with sticky mucus, peculiarly unpleasant
of appetite, much thirst, nausea but rarely vomiti
with offensive stools. The urine is sometimes

on of the phenomena observed has been given by Anstie. The ordi- ary signs may be summed up as follows:—1. Nervous phenomena. hese include muscular restlessness and fidgetiness, culminating in emors, beginning in the limbs, at first slight and controlled by an effort f the will, but afterwards becoming more marked and constant, worse in e mornings, and then diminished by food and drink; insomnia, or y disturbed and unrefreshing sleep with horrible dreams; diffused pain or heaviness in the head, and sudden attacks of vertigo; dis- der of the special senses, as evidenced by photopsia or muscæ voli- tes, and noises in the ears; mental disturbance, indicated in the ly period by mental disquietude, uncertainty of purpose and inability fix the attention upon anything, indecision of character, a vague e of dread, or fits of violent temper; later on by impairment of the ntal faculties, in some cases very marked, the patient having horrible ions or delusions as to people plotting his ruin, and exhibiting great ardice with loss of moral power, and a particular tendency to tell ehoods about drink; impairment of muscular co-ordination, which plains the sensation sometimes experienced by the patient, as if he re going to fall down a precipice when walking on firm ground. General appearance. The signs coming under this head are more or s obesity or emaciation, the former being chiefly observed in beer- nkers, the latter, which may be extreme, in spirit drinkers; flabbi- s or a bloated aspect of the features, with red and watery eyes, owness of the conjunctiva from fat or jaundice, and often redness of e face with enlarged vessels, especially about the nose and cheeks, acne. 3. Disorder of the alimentary canal, indicated by total orexia or disgust for food, especially in the mornings, the patient often king this an excuse for taking stimulants, in order to "keep up" the stem; thick dirty furring of the tongue as a rule, but not always; yness and cracking of the lips; catarrh of the pharynx; peculiar and gusting foulness of the breath; severe morning nausea or actual kness; irregularity of the bowels, with fœtid stools; occasionally ious hæmorrhage from the stomach or bowels. 4. Symptoms due to anic visceral changes and to degenerations. These have been nted out in previous chapters, and, as already stated, there is much erence of opinion as to the influence of alcohol in their production. ere can be no doubt as to the direct effect of strong spirits upon the cous membrane of the alimentary canal, and especially that of the mach, these inducing congestion, chronic inflammation, fibroid nges, and glandular degeneration; or that alcoholic abuse tends lead to fibroid and fatty degeneration, with atrophy of various ans and tissues, including the nerve-centres.

In very advanced cases of chronic alcoholism still more grave nervous ptoms are met with, such as absolute dementia; marked sensory alysis in different parts; extreme muscular trembling, simulating alysis agitans; general muscular weakness; paralysis or ataxia; epi- tiform attacks; or finally coma. Such phenomena must be attended h serious organic changes in the nervous system.

DIAGNOSIS.—Delirium tremens has to be mainly distinguished from te mania or meningitis. The circumstances under which it occurs, characters of the *nervous and extrinsic* symptoms; and absence of

ticularly liable to be simulated by chronic alcoho
general paralysis of the insane; paralysis ag
locomotor ataxy; softening of the brain or c
dementia; hysteria; and the nervous malaise
forms of dyspepsia.

PROGNOSIS.—Delirium tremens usually termir
chief unfavourable circumstances are :—Chronic
of alcohol, so that the system is more or less satur
advanced in years, enfeebled in constitution, or
visceral disease, especially disease of the kidneys
attacks, particularly if numerous; difficulty in ge
the system, either from the patient refusing foo
being impaired; inability to procure sleep befor
exhausted; an unfavourable condition of the pul
sphygmograph; the occurrence of typhoid or lc
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monia. In the early period chronic alcoholism
the patients will keep away from drink, but it i
matter to get them to do this. When serious r
become developed there is but little hope of imp

TREATMENT.—In treating delirium tremens, tl
be to withdraw or reduce the quantity of all for
lant, so far as this is practicable, but especially
large proportion of cases it has been found tl
results from cutting off stimulants completely
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as possible, being chiefly needed if the patient
old, or feeble, or if there are signs of adynamia
malt liquors, if it can be managed, but brandy ma
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possible into the system. Strong beef tea, beef

al (gr. xx every hour or two); bromide of potassium (gr. xx every
ırs); and extract or tincture of cannabis indica. As a general
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ıts in delirium tremens require to be narcotised into a state of
' but I have met with cases in which the only chance of recovery
. to be in procuring sleep at any risk, and where the administra-
considerable doses of morphia, combined with abundant nourish-
proved, I believe, the means of saving life. Other remedies
'ed in the treatment of delirium tremens are tincture of digitalis
ge doses (ʒij to ℥i every four hours), originally introduced by
ınes of Jersey; powdered capsicum or the tincture in full doses;
metic in sthenic cases attended with wild delirium; and chloro-
either by inhalation or internally. Chloroform inhalation care-
mployed may be decidedly serviceable sometimes.

ıptoms often require attention in acute alcoholism, especially
ng. Should there be adynamic signs, stimulants must be given,
monia, ether, musk, or camphor, along with brandy. Complica-
may call for interference, particularly pneumonia, which always
a supporting treatment in these cases. A patient suffering from
m tremens should be placed in a comfortable and well-ventilated
kept perfectly quiet and apart from friends, only one or two
l attendants being permitted to be present, according as the
t is peaceable or violent; treated kindly but with firmness; and
ntly watched, lest he should injure himself. Mechanical restraint,
ıs by means of the straight-waistcoat, is but rarely admissible,
ı it is needed now and then in cases of extreme violence.

treating chronic alcoholism, there should in most cases be no
ion in forbidding stimulants entirely, but especially spirits or wine.
often, however, difficult to persuade patients to carry out this
. A glass of good bitter ale or stout along with food may be
in some instances, and Anstie recommended the latter at night in
o procure sleep. It is most important to induce the patient to
ourishment, and as there is generally a great distaste for food, small
ties of milk, concentrated beef-tea, soups, or meat-juices should
n at frequent intervals. It is wonderful, however, how soon the
e returns in many of these cases when the intemperate habits are
ished. If there is much sickness, an effervescent mixture may be
or soda-water with milk. I have found a mixture containing
nate of soda or nitro-muriatic acid with infusion of gentian and
r four minims of hydrocyanic acid very serviceable in many cases.
recommended one or two grains of quinine twice or thrice daily.
found oxide of zinc useful, beginning with two grains twice daily,
adually increasing the dose. Others give tincture of capsicum.
e is much restlessness and sleeplessness, a full dose of bromide
ıssium at night will generally procure sleep, or this drug may be
nore frequently if necessary. Some prefer subcutaneous injection
phia: hydrate of chloral; extract of cannabis indica; or a full
f sulphuric ether. Baths are often serviceable in chronic alco-
; and rest from occupation, with change of air, aids recovery
ılly. The bowels should be kept well-opened.

ıdvanced cases the treatment must be varied according to the

Chapter LXXIX.

ON CERTAIN FORMS OF METALLI

I. Lead Poisoning—Saturn

Etiology.—The introduction of lead into the
portant in connection with certain occupations
used, saturnism being especially common among
workers in white-lead. Sometimes it acts as a
taken in water kept in leaden cisterns, in cider,
or medicinally; it may be inhaled from fresh pa
gains access into the body in curious ways, as
snuff, or rubbing the ointment into the skin. As a
swallowed or inhaled, and often enters the syst
nels. It becomes in time deposited in the various
especially in the muscles, nerves, and nerve-c
nutrition, the muscles becoming the seat of ma
and atrophy.

Symptoms.—Certain objective appearances a
in connection with chronic saturnism, viz., the so
gums at their junction with the teeth; a dirty b
tion of the latter, if they are not cleaned, with ra
more or less emaciation, with a dry harsh skin,
pale, or yellowish tint of countenance, with yell
tivæ. The breath is generally offensive, and a
quently experienced. In some cases the pulse
slow. The prominent clinical phenomena which
lead-poisoning may be summed up thus:—1.
characters of more or less severe intestinal coli
with a retracted abdomen; absolute constipation
eructations: and hiccup. 2. Disorders of sensati

fore-arm, and those of the hands may also be much atrophied, so as ake them assume the crow-foot shape. Sometimes they are strongly ed, as if the flexor muscles were rigid. The condition of electric tractility and sensibility has been already considered. The predis- ing influence of lead in the system with reference to gout has been ded to in connection with that disease.

TREATMENT.—Preventive measures are most important in the case of se working with lead. They should be very particular as to cleanli- s, especially in washing their hands and cleaning their nails before ting, and in cleansing their lips and teeth. Every precaution should taken against inhaling particles of lead. I believe a good deal of the tal is often introduced during meals, and the practice of taking a tle dilute sulphuric acid in water at this time may be useful, as this uld form an insoluble compound with any lead entering the stomach. e bowels must always be kept well opened. If there is any lead in system, iodide of potassium may be given from time to time. Lead- c must be treated in the same way as other forms of intestinal colic. e great remedy for getting the metal out of the system, which is the object to be aimed at in all cases, is iodide of potassium, a soluble ide of lead being formed, which passes away in the urine and other retions. It must be given for a long time. Sulphur baths are also said be useful. Paralysis, neuralgic pains, and other nervous symptoms st be treated according to the principles previously laid down.

II. MERCURIAL POISONING.

Individuals who work with mercury are liable to peculiar tremors m the inhalation of this metal, and these have also occasionally fol- red its medicinal employment. There are the usual signs of mercu- ization in connection with the mouth and general system. The mors almost always begin in the upper limbs, being accompanied h numbness or formication and pains in the joints, but may after- rds extend to the legs, trunk, face, tongue, and respiratory muscles; short, to all except those of the eyeballs. At first the movements are t slight, but afterwards increase so as to be spasmodic or convulsive, untary acts being performed in a violently jerking or spasmodic nner. They are greatly increased by any mental excitement. Finally re or less trembling becomes constant, and the patient is rendered ite helpless as to voluntary movements, speech and breathing being o gravely affected. In most cases the tremors subside if the patient supported in a sitting or recumbent posture, and they also cease ring sleep. Stimulants diminish them temporarily, but they are worse rwards. The tremulous muscles are decidedly weak. In very ad- nced cases serious nervous symptoms arise, such as sleeplessness, irium, coma, or epileptiform convulsions.

TREATMENT.—As soon as any of the symptoms described appear, the ient should immediately give up his occupation for a time. For the mination of the mercury the chief remedies are warm, vapour, or phur baths; sulphur or iodide of potassium internally; and purga- s; medicinal diaphoretics and diuretics may also be employed. For nervous symptoms quinine, iron, opium, nitrate of silver, and gal- ism are recommended.

ber that this may be set up in cases where there
tion of the joints. Dr. Dickinson has advai
endocarditis may be the consequence of chore
by the irregular action of the heart.

Cases of chorea are occasionally met with ir
present an extremely acute and virulent characte
ments being excessively violent and constant, an
the body. The patient is unable to swallow or pe
and is greatly distressed and exhausted, sleep be
ensues if the movements do not abate, often
symptoms, delirium, or coma, but the intellect
the last. Two such fatal cases, occurring in gir
puberty, have come under my notice, and sim
observed in connection with parturition.

Diagnosis.—The symptoms of well-marked
istic, that it is scarcely possible to make a mis
therefore no special remarks need be made on tl

Prognosis.—Chorea almost always terminate
the severe form alluded to above. No definite
should be given. The circumstances favourabl
are that the disease is due to some conditior
treatment; that this is commenced at an earl
patient can be placed under proper sanitary co
of the development of the cardiac complication
in mind. Chorea increases the danger from acu

Treatment.—It is difficult to estimate the v
treatment of chorea, as the complaint so ofte
taneous cure. The indications which should be
1. To get rid of any obvious cause of reflex di
late carefully the diet and the state of the dig

phosphites; Calabar bean in the form of powder, extract, or tincture; a combination of morphia with strychnia; or chloroform inhalation twice or thrice daily. From personal experience I do not think that any one of these remedies is applicable to all cases, but one or other may be found of service in different instances. The application of ice to the spine; the passage of a slight constant galvanic current along this region; and subcutaneous injection of curare, are other special modes of treatment which have been advocated. The movements may often be diminished by proper discipline and gymnastic exercises. When the disease is seen in its very early stage, some believe that they can check its course by exciting a free action of the skin by means of warm or hot-air baths, followed by saline medicines or small doses of tartar emetic. Others employ emetics at the outset. Should sleep be much disturbed, some narcotic must be given. If the movements are very severe, it will be well to let the patient sleep on an air- or water-bed. Chorea complicating acute rheumatism usually needs no special treatment. Those dangerous cases in which the movements are extremely violent are but little amenable to any treatment. Inhalation of chloroform; subcutaneous injection of morphia, or perhaps of curare; and supporting the patient, by enemata if necessary, seem to me the most reliable measures.

CHAPTER LXXVII.

TETANUS—LOCK-JAW.

Etiology and Pathology.—Though almost always of *traumatic origin*, and therefore occurring in surgical practice, a brief description of tetanus is needed in this work, as it occasionally comes under the notice of the physician as an *idiopathic* affection, resulting from a person being exposed to cold or wet, sleeping on damp ground, or becoming chilled when perspiring; or attacking infants soon after birth. It is probably a functional disorder of the spinal cord, dependent upon peripheral nerve-irritation, which leads to reflex disturbance. Certain morbid appearances have been described in the cord, but they cannot in the present state of knowledge be said to be at all characteristic.

Symptoms.—The peculiar features of tetanus are persistent tonic spasm or rigidity of the muscles; with extremely painful paroxysms of cramps occurring at intervals. The patient first complains generally of pain and stiffness behind the neck, which increases until the muscles become fixed, the head being drawn back. Then trismus or lock-jaw sets in, and swallowing becomes difficult. Next the rigidity extends to the muscles of the trunk; and finally may involve all the voluntary muscles, except those of the hands, eye-balls, and tongue. They feel hard, tense, knotted, and rigid. The body is generally curved backwards (*opisthotonos*), but may be rigidly stretched out (*orthotonos*), bent forward (*emprosthotonos*), or laterally (*pleurosthotonos*). A very painful feel-

tenance presents the "risus sardonicus," and h
pression, combined with that of anguish. Breat
to the fixation of the respiratory muscles, this caus
of oppression and impending suffocation, but the a
in the intervals. The voice is weak. During th
heat and sweating, and the pulse is very frequen
becomes impossible for the patient to swallow
very hungry and thirsty, while the mouth is clog
Sleep is entirely prevented. There are no hea
intellect remains undisturbed. The pupils are
sensation is not affected, but there is increased re
power over the sphincters is retained; constipatic
and micturition is often difficult. Death is a ver
either from sudden or gradual apnœa; asthenia
want of support; or both causes combined. Th
cases rises to a very high degree before death, a
after death. Recovery occasionally takes place
very slow. Temporary remissions not uncomm
apt to mislead as to the ultimate issue. Tetanus
a somewhat chronic course. It is usually less acu
idiopathic than when traumatic.

Diagnosis.—Strychnine-poisoning is the chie
tetanus is likely to be confounded; for the distir
be made to toxicological works. It might pos
hydrophobia; acute spinal meningitis; or certain

Prognosis is extremely grave, as may be ga
been previously stated, but the disease is not nec

Treatment.—The only measures which seen
in idiopathic tetanus are to use warm, vapour, o
to administer subcutaneous injections, either o
nicotine; to relieve the spasms by inhalation
support the patient by liquid nourishment and sti
in the form of enemata when they cannot be swal

CHAPTER LXXVIII.

ALCOHOLISM.

ETIOLOGY.—The injurious effects upon the system of alcoholic abuse are but too well known. They are the result of its direct irritant action; its influence on the vaso-motor nerves; the circulation of its own poisonous elements, or those derived from its decomposition, through the various organs and tissues; and its interference with tissue-metamorphosis, oxygenation, and nutrition. The exact effects will depend on the nature, quantity, and strength of the stimulant indulged in. Spirits do by far the greatest harm, especially when taken in frequent drams, strong, and on an empty stomach. Alcoholism is most frequent in males; and in those who from their occupation are exposed to intemperance, as draymen, potmen, or cabmen, or whose calling is a lonely or sedentary one. It is also predisposed to by various conditions which depress the nervous energy, such as working or sleeping in a hot vitiated atmosphere; excessive mental work; anxiety or worry; or excessive venery. Persons who suffer severe pain and hysterical individuals are very likely subjects to drink to excess. In not a few instances there seems to be a hereditary tendency to alcoholism, or to some neurosis, such as epilepsy or mania.

SYMPTOMS.—Cases of alcoholism may be included under the following groups:—1. Acute alcoholic poisoning, the symptoms being those of narcotic poisoning. 2. Delirium tremens. 3. Chronic alcoholism. 4. Acute mania, in which the patient is extremely violent and dangerous and has a fixed delusion. 5. Acute melancholia, with suicidal endency. 6. Oinomania, where there is a constant craving for drink, which breaks out at intervals into an uncontrollable propensity, the moral sense being entirely dead, so that the subjects of this condition will do anything to obtain drink. Only delirium tremens and chronic lcoholism can be specially considered here.

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or medicinally; it may be inhaled from fresh
gains access into the body in curious ways, as
snuff, or rubbing the ointment into the skin. As
swallowed or inhaled, and often enters the sys
nels. It becomes in time deposited in the vario
especially in the muscles, nerves, and nerve-
nutrition, the muscles becoming the seat of m
and atrophy.

SYMPTOMS.—Certain objective appearances
in connection with chronic saturnism, viz., the
gums at their junction with the teeth; a dirty
tion of the latter, if they are not cleaned, with
more or less emaciation, with a dry harsh ski
pale, or yellowish tint of countenance, with ye
tivæ. The breath is generally offensive, and
quently experienced. In some cases the pul
slow. The prominent clinical phenomena whic
lead-poisoning may be summed up thus:—1
characters of more or less severe intestinal co
with a retracted abdomen; absolute constipatio
eructations; and hiccup. 2. Disorders of sensa
sia or hypæsthesia of different parts, numbne

e fore-arm, and those of the hands may also be much atrophied, so as make them assume the crow-foot shape. Sometimes they are strongly osed, as if the flexor muscles were rigid. The condition of electric ntractility and sensibility has been already considered. The predisosing influence of lead in the system with reference to gout has been luded to in connection with that disease.

TREATMENT.—Preventive measures are most important in the case of ose working with lead. They should be very particular as to cleanliess, especially in washing their hands and cleaning their nails before ating, and in cleansing their lips and teeth. Every precaution should e taken against inhaling particles of lead. I believe a good deal of the etal is often introduced during meals, and the practice of taking a tle dilute sulphuric acid in water at this time may be useful, as this ould form an insoluble compound with any lead entering the stomach. he bowels must always be kept well opened. If there is any lead in e system, iodide of potassium may be given from time to time. Lead-ic must be treated in the same way as other forms of intestinal colic. e great remedy for getting the metal out of the system, which is the in object to be aimed at in all cases, is iodide of potassium, a soluble ide of lead being formed, which passes away in the urine and other retions. It must be given for a long time. Sulphur baths are also said be useful. Paralysis, neuralgic pains, and other nervous symptoms st be treated according to the principles previously laid down.

II. MERCURIAL POISONING.

Individuals who work with mercury are liable to peculiar tremors om the inhalation of this metal, and these have also occasionally fol-wed its medicinal employment. There are the usual signs of mercu-lization in connection with the mouth and general system. The emors almost always begin in the upper limbs, being accompanied th numbness or formication and pains in the joints, but may after-rds extend to the legs, trunk, face, tongue, and respiratory muscles; short, to all except those of the eyeballs. At first the movements are t slight, but afterwards increase so as to be spasmodic or convulsive, luntary acts being performed in a violently jerking or spasmodic nner. They are greatly increased by any mental excitement. Finally ore or less trembling becomes constant, and the patient is rendered ite helpless as to voluntary movements, speech and breathing being o gravely affected. In most cases the tremors subside if the patient supported in a sitting or recumbent posture, and they also cease ring sleep. Stimulants diminish them temporarily, but they are worse terwards. The tremulous muscles are decidedly weak. In very ad-nced cases serious nervous symptoms arise, such as sleeplessness, lirium, coma, or epileptiform convulsions.

TREATMENT.—As soon as any of the symptoms described appear, the tient should immediately give up his occupation for a time. For the mination of the mercury the chief remedies are warm, vapour, or phur baths; sulphur or iodide of potassium internally; and purga-ves; medicinal diaphoretics and diuretics may also be employed. For e nervous symptoms quinine, iron, opium, nitrate of silver, and gal-nism are recommended.

causes, viz., wearing heavy or tight clothing anc cal fatigue and exhaustion; the state of system ing and bad ventilation; and deficiency of authorities are of opinion that a moist atmosp one. The immediate cause of sun-stroke is be with evaporation and radiation from the skir over-heated, and thus exerts an injurious and d nerve-centres.

Anatomical Characters.—The only post- fluidity of the blood; some congestion of th extreme pulmonary congestion, with distension

Symptoms.—Generally there are premonito heat and dryness of the skin, with a subjecti stinging, the temperature being often hyper-p and sense of exhaustion; thirst and nausea; headache; conjunctival redness; frequent de sometimes delirium or delusions. Dr. Muirhea of the actual attack—*cardiac; cerebro-spinal;* there is sudden syncope, often terminating in s bro-spinal form is characterised by coma; hu stertorous breathing; contracted and immovab junctivæ; convulsions in many cases; tumult with a very rapid, and in a short time feeble, co pulse. The temperature may reach 112° or rise after death in fatal cases. Should recover liable to be left, such as constant headache, me form movements, or a tendency to epileptiform

Treatment.—Attention should be at once symptoms of sun-stroke. As a rule the great use of the cold douche over the head, neck, an of which may be required but care is necessa

CHAPTER LXXXI.

DISEASES OF THE BRAIN AND ITS MEMBRANES.

CLINICAL CHARACTERS.—Before proceeding to describe cerebral diseases, it will be well to give a summary of the special clinical phenomena which point to this portion of the nervous system, and they may be stated generally as—1. Morbid sensations in the head. 2. Mental disturbance. 3. Subjective disorders of the special senses. 4. Signs of irritation or paralysis of the cranial nerves. 5. Sensory and motor derangements in the limbs and trunk, usually unilateral, occasionally of general distribution, sensation, however, being as a rule much less affected than motion. 6. Physical alterations about the head in some cases. 7. Objective changes in the eyes, as seen by the ophthalmoscope. 8. Certain extrinsic symptoms, especially vomiting and obstinate constipation. In some conditions respiration and circulation are much affected; and in exceptional instances peculiar phenomena are observed.

The precise symptoms in any particular case of brain-disease, however, vary very widely, both in their nature and degree, according to the rapidity with which the mischief is set up; the seat, extent, and number of distinct centres of lesion; and the effects produced on surrounding parts. So far as is practicable the clinical variations thus occasioned will be pointed out in the following chapters, but for fuller information reference must be made to the special writings of Hughlings Jackson, Ferrier, Brown-Sequard, Lockhart Clarke, Ogle, and others.

ACUTE CEREBRAL INFLAMMATIONS.

1.—SIMPLE OR PRIMARY MENINGITIS.

ETIOLOGY.—The *exciting causes* of simple meningitis are:—1. Direct injury to the membranes, especially from fractures of the skull. 2. Disease of the cranial bones, particularly of the temporal in connection with ear-affections. 3. Prolonged direct exposure to the sun. 4. Excessive mental labour. 5. Erysipelas of the head and face. 6. Local irritation from adventitious growths, &c. 7. It is said exposure to cold and wet. 8. Certain acute exanthemata in rare instances. 9. Sudden disappearance of chronic cutaneous eruptions (?). Inflammation of the cerebral membranes is also a part of cerebro-spinal fever, and may result from extension upwards of spinal meningitis. The disease is most frequently met with in male adults. A hot climate and season; undue mental work, especially if combined with loss of sleep; a weak and exhausted condition of the system from previous illness or any other cause; intemperate habits; and the presence of Bright's disease, are regarded as *predisposing causes*.

ANATOMICAL CHARACTERS.—As a rule acute simple meningitis involves the membranes extensively, but is most marked over the convexity of the cerebral hemispheres. It may, however, be localised, or be evident chiefly or solely about the base. The dura mater does not often present any particular change, unless it is locally affected from injury or bone-disease, when it may be reddened, black and sloughy, or unusually adherent; occasionally exudation or pus collects between it and the bone. Sometimes also inflammation is set up in the venous sinuses, leading to the formation of a thrombus, which may soften into a purulent-looking fluid, and give rise to embolism and blood-poisoning. Generally the cerebral arachnoid appears dry and parchment-like, and

or less purulent looking, covers the surface,
in the sulci between the convolutions, and alon
When the inflammation affects the base the exudati
the cranial nerves. The brain frequently preser
condition of the superficial layer of its grey matt
longed cases, indicated by redness, softening, and
mater. The ventricles are normal in many case
excess of serum or pus, or have the walls covered w

SYMPTOMS.—Acute meningitis is usually prece
symptoms, such as increasing headache or a sense o
disturbances of general sensation or of the specia
with a feeling of depression and restlessness; or si
is usually directly ushered in by a marked rigor or
speedily followed by pyrexia and severe headache,
ing. In exceptional instances the first symptoms a
vulsions, hemiplegia, aphasia, or stupor ending in
phenomena of the established disease are divided i
follows:—

I. *Stage of excitement.*—At this time the sympto
thus:—*a. Local.* Intense and constant headache,
frontal, of a tight or binding character, with sudde
ing exacerbations, which may be so violent as to
shrieks, the pain being increased by any slight di
ment, noise, or light; marked vertigo; great heat o
or alternate flushing and pallor of the face, and co
b. Mental. Great irritability and unwillingness to
sleeplessness, culminating speedily in delirium, a
active character, not uncommonly being almost m
sion being wild, staring, and savage, or sometim
terror, and the patient shrieking and gesticulat
violent. Occasionally the delirium is more of
c. Sensorial. General hyperæsthesia; tingling or

requent, hard, and sharp; the tongue white and the mouth clammy, ith great thirst and loss of appetite. Cerebral vomiting is a prominent ymptom, and also constipation as a rule, the stools being offensive and lark. Breathing is generally irregular and moaning. The duration of his stage may vary from one to fourteen days or more.

II. *Stage of transition.*—This is characterised by the cessation of the ymptoms of excitement just described, with the development of those dicating failure of the cerebral functions, and there may be a remark-ble improvement at its commencement. Generally the change is more r less gradual, but may be very rapid, a sudden fit of convulsions occa-onally ushering in the final stage. As a rule the headache, delirium, alted sensations, and fever subside; while there is a tendency to aviness, somnolence, or muttering stupor ending in coma, with taneous hypæsthesia or anæsthesia, and impairment of sight and aring. Motor disturbances become more prominent and general, the way of carphology, subsultus tendinum, twitchings or tremors, asmodic movements or convulsions, or paralysis. The pupils be-me dilated and motionless. The body and limbs cool down con-derably, though the head may still remain hot; the pulse is less quent, but very variable, and sometimes intermittent; the tongue nds to become dry and brown. Respiration is irregular and sighing. rine is retained and may overflow. These symptoms culminate in:—

Stage III, in which there is complete abolition of the cerebral func-ons, as shown by absolute coma with stertorous breathing; general næsthesia, with muscular paralysis and relaxation; great dilatation and nmobility of the pupils; and involuntary escape of fæces and urine. he patient presents an aspect of extreme prostration and adynamia, he features being sunken and ghastly, the surface bedewed with cold lammy sweats, the tongue dry and brown, the teeth and gums covered ith sordes, while the pulse is excessively rapid, thready, and fluttering. n this condition the patient sinks more or less speedily.

Differences are observed in the symptoms according to the seat and tent of the inflammation. If it affects only one hemisphere there may be emiplegia. If it is localised, the symptoms are correspondingly limited. hen the base is most affected it is said that the pain is more sub-rbital and sub-occipital; the mental and sensorial excitement is less arked, delirium being comparatively slight and transient: special aralysis of some of the cranial nerves is observed; while coma sets early and speedily becomes profound. Ophthalmoscopic signs are ident when the inflammation is conveniently situated, viz., those of uritis or ischæmia. Hyperæmia is commonly present.

Local inflammation of the dura mater, due to injury or bone disease, generally very obscure in its clinical history. The symptoms which ay indicate this condition are pain, at first localised, being often ated behind the ear, but gradually extending over the head; local nderness over this part sometimes, or painful œdema; little or no rebral disturbance at first, but in course of time gradual somnolence ding in coma, or sometimes delirium and convulsions; rigors, which ay be periodically repeated, with pyrexia; diminished fulness of the gular vein on the same side, if a thrombus forms; and signs of æmia and embolic deposits in other parts.

II. TUBERCULAR MENINGITIS—ACUTE HYDROCEPHALUS.

ETIOLOGY.—This variety of meningitis is immediately due to local irritation set up by tubercles. Therefore all causes predisposing to tuberculosis may be considered as predisposing to tubercular meningitis, and where a hereditary tendency exists, whatever leads to local excitement in connection with the brain, as unduly forcing the mental faculties in young children, tends to give rise to the formation of tubercle here. Children are by far the most frequent subjects of tubercular meningitis, especially from two to ten years of age, but it may be met with from earliest infancy to old age, and is not uncommon up to the time of puberty and in young adults. Hereditary predisposition can be traced in a large majority of cases. This complaint not unfrequently follows one of the exanthemata.

ANATOMICAL CHARACTERS.—Miliary tubercles are found in greater or less abundance in the meshes of the pia mater, often adhering to the under surface of the arachnoid. They are frequently whitish and opaque, or may be softened and yellowish in the centre. They may appear scattered all over the surface, but are principally seen about the base of the cerebrum; in the fissures, especially the fissure of sylvius; and along the chief branches of vessels. The membranes are injected, especially the pia mater. The surface of the arachnoid feels sticky, and a thin layer of soft lymph or puriform matter can often be scraped off; this substance usually collects in abundance between the arachnoid and pia mater, especially about the base and in the fissures. The pia mater is thickened, and its meshes are infiltrated with the same material or with serum. As a rule there is little or no fluid in the arachnoid sac. Occasionally the signs of inflammation are chiefly observed over the convexity. The ventricles of the brain generally contain a considerable quantity of colourless, usually somewhat turbid and flocculent serum, often amounting to some ounces in each lateral ventricle, and this leads to œdema, maceration, and softening of the surrounding brain-structures; dilatation of the spaces and their communicating channels; as well as frequently to compression of the convolutions of the cerebrum against the skull, so that they appear flattened and pale. Sometimes when the dura mater is opened the brain gives way, and the serum escapes. The walls of the ventricles are generally covered more or less with fine granulations. The exact appearances vary considerably in different cases; in some the signs of meningeal inflammation are most prominent; in others the quantity of fluid in the ventricles is most striking. There is no proportion between the amount of tubercle and of the products of inflammation. Tubercle is generally present in other structures, sometimes in the brain itself.

SYMPTOMS.—Tubercular meningitis in children is generally preceded for a variable period by those premonitory symptoms previously described as being observed in connection with tuberculosis; while nervous symptoms are often prominent, as fretfulness, drowsiness, sudden starting, screaming, grinding of the teeth during sleep, headache, vertigo, or a staggering gait. They may, however, be entirely absent: while in some cases the disease supervenes on long-standing tubercular mischief in other parts. The symptoms of the established disease are described as following certain stages, and these have been differently classified by different writers. Certainly they are often very indistinctly marked in practice, and cases present considerable variety in their clinical history. The meningitis may be very obscurely indicated, being but a part of general acute tuberculosis; or its special symptoms may be those which attract attention. The characteristic phenomena are usually those of basic meningitis, with general cerebral excitement; followed by total abolition of the cerebral faculties, owing to the pressure of the fluid.

The invasion is in most cases more or less gradual, and not infrequently very insidious. Sometimes the disease sets in very rapidly or suddenly. The chief invasion-symptoms which may be met with are severe vomiting; intense headache; rigors, followed by pyrexia; marked irritability, nervousness, and obstinacy or unreasonableness in behaviour; or drowsiness. Occasionally tubercular meningitis is revealed by sudden convulsions, delirium, coma, or paralysis.

The ordinary clinical history of the developed disease is more or less as follows:—The early symptoms are severe constant headache, generally frontal, increased by movement, light, or noise, with intense darting paroxysms, causing the child to scream or cry out, and to hold the head; vertigo, giving rise to staggering and a tendency to cling to surrounding objects; alternate flushing and pallor of the face, the expression being often frowning or sad, or sometimes vacant and stupid; heat of head; marked intolerance of light and sound; general hyperæsthesia or dysæsthesia; great irritability and peevishness, with unwillingness to be disturbed, to answer questions, or take food; insomnia or very disturbed sleep; sometimes slight wandering at night, but no marked delirium; unsteady gait, with dragging of the limbs; constant restlessness; grinding of the teeth; alternate contraction and dilatation of the pupils; severe vomiting; usually obstinate constipation and retraction of the abdomen; complete anorexia, without any particular thirst, the tongue being furred, and the breath offensive; moderate but irregular pyrexia, the temperature not often rising above 101° or 102° in the evenings, the skin being usually harsh and dry, the pulse rather frequent, but easily hurried to 120 or more, and the urine concentrated, but very deficient in chlorides, phosphates, and urea. Subsequently the mental faculties are more disturbed, as evidenced by delirium in some cases, either wild and restless or muttering, and increasing drowsiness, with tendency to stupor. General sensibility becomes impaired, and the hyperæsthesia of the special senses ceases, while signs are developed of implication of the cranial nerves at the base of the brain, such as dim or double vision or hemiopia; tinnitus aurium and partial deafness; twitchings about the face; strabismus; oscillation of one or both eyeballs; dilatation, inequality, or marked oscillation of the pupils, these being not very sensitive to light. The face assumes a worn, aged, distressed expression, the eyes being half-closed. Vomiting ceases, and diarrhœa may set in. Fever diminishes, while cool sweats often break out, and the pulse becomes in many cases remarkably infrequent and slow, but at the same time extremely variable and fluctuating, as well as often irregular in rhythm and force. Respiration becomes sighing or moaning and irregular. Still later there is marked general motorial disturbance, as evidenced usually by violent, prolonged, and frequent fits of convulsions; or by tetanic rigidity, the head being drawn back, boring into the pillow, or rolling from side to side; subsultus tendinum; tremulousness of the limbs; local paralysis or hemiplegia; or occasionally cataleptic phenomena. The face exhibits grimaces from the muscular twitchings, with partial paralysis; the eyes are half-closed, dim, and covered with a film. When not convulsed the child is generally picking at the bed-clothes, or boring the fingers into the ear or nostril. The pupils are dilated and motionless. The final symptoms include gradual anæsthesia of all the senses; deepening coma; general muscular relaxation, with slight twitchings; involuntary passage of urine and fæces; coldness of the extremities, with general cold sweats; and an extremely rapid, feeble, and irregular pulse. Death may take place from gradual coma, or during a fit of convulsions. In some cases the temperature rises considerably before death, or it may sink much below the normal. The ophthalmoscope reveals hyperæmia of the disc, ischæmia, or optic neuritis; and in very rare instances tubercles have been seen in the choroid. Sometimes the head becomes enlarged, the fontanelles at the same time being very prominent and presenting pulsation if they are not closed up.

When tubercular meningitis affects only the convexity of the cerebrum, Dr. Gee states that the prominent symptoms are a constant convulsive state, with moderate pyrexia, and a pulse which is rapid and very variable in its frequency.

The ordinary duration of cases of tubercular meningitis in children is said to be from 7 to 23 days. Rilliet states that when prodromata are wanting, it averages from 20 to 30 days. When the convexity is involved, the disease terminates in one or two weeks or even sooner. In the course of a case a remarkable remission in many of the symptoms is frequently observed, simulating recovery, but some of them still remain, and it is very important not to mistake this improvement for a sign of convalescence.

In the adult tubercular meningitis is generally considered as being in most cases secondary to chronic tubercular disease, especially to pulmonary phthisis, the symptoms of which often improve markedly just before those of meningitis are developed. Gee states, however, that *primary* tubercular meningitis is at least as common as *secondary*. The symptoms more or less resemble those in the child, the most prominent being severe frontal headache with darting paroxysms; heat of head, with redness of the face or alternate flushing and pallor, and suffused conjunctivæ; often a dull, bewildered, heavy, or stupid expression, with mental confusion; a tendency to somnolence and stupor, alternating with wild delirium; indisposition to speak, or sometimes sudden complete aphasia; photophobia and intolerance of sound; evidences of irritation or paralysis of some of the cranial nerves, such as twitchings or paralysis about the face, ptosis, dilated or unequal pupils, strabismus; convulsive seizures; paralysis of the limbs; and cerebral vomiting. Deep coma follows, with general paralysis, and involuntary passage of fæces and urine, terminating in death.

III. RHEUMATIC MENINGITIS.

The meningitis which exceptionally complicates acute rheumatism
been distinguished as a special variety, but it only requires to
mentioned here. Its development is usually accompanied with a
rked diminution in the joint-symptoms. The symptoms are those of
ple meningitis, but it is said that the early stage is less violent, and
progress of the case more rapid. It must be remembered that grave
ebral symptoms may arise in the course of rheumatic fever indepen-
tly of any meningeal inflammation.

V. ACUTE CEREBRITIS OR ENCEPHALITIS.—CEREBRAL ABSCESS.

TIOLOGY.—Inflammation of the brain-substance may result from :—
njury caused by fractures, wounds, or mere concussion. 2. Disease
he bones, especially in connection with chronic ear-affections. or
sionally with acute disease of the internal ear. 3. Extension from
ingitis. 4. Local irritation by adventitious morbid products, extrava-
d blood, or spots of softening. 5. Various acute and chronic diseases,
cially if attended with suppuration, the inflammation being then
ably pyæmic or septicæmic in character. Thus cerebritis has been
with in low fevers, especially typhus ; acute pneumonia ; chronic
onary phthisis; dysentery; or in connection with abscesses in
rent parts of the body. 6. Insolation. 7. Prolonged mental labour
ibly. Sometimes no cause can be made out.

NATOMICAL CHARACTERS.—Cerebritis is described as *diffuse* or
al: and *local.* The former does not imply that the whole brain is
icated, which is never the case, but merely that there is extensive
mmation of the superficial grey matter, this condition being only
iated with meningitis, and evidenced by redness, softening, and
sion to the pia mater when this is stripped off. Local cerebritis is
ed to one or more spots of variable dimensions. Some pathologists
d this morbid change as being the invariable cause of *acute soften-*
r *ramollissement*, especially of *red softening.* As will be hereafter
ted out, however, it is far more likely that the condition thus
ribed is in the great majority of cases due to other pathological
es. When resulting from inflammation, it is said that the specific
ty of the softened portion is increased. It is supposed that the
r may become yellow or green from infiltration of the affected tissue
exudation or pus. The most important termination of local cere-
is the formation of an abscess, which only happens, however, in
ection with injury, bone-disease, or pyæmia. Usually the abscess
gle, but there may be several, especially in pyæmic cases. The
substance in the centre of the hemisphere is its most common
but any part of the brain may be involved, and when the abscesses
umerous, they are usually situated chiefly near the surface. The
aries as a rule from that of a pin's head to that of a nut or egg ;
hemisphere may be occupied by one large abscess, which alters
ape and flattens its convolutions against the skull. When there
everal abscesses, they are usually small. The shape is irregularly
l or oval. *At first the walls* are ragged, softened, or inflamed ; but

if the disease lasts for some time, a firm fibrous or fibro-cellular capsule is formed, which may attain considerable thickness, becoming lined by a smooth membrane. The pus may be tolerably healthy, yellow or green, or sometimes red from admixture of blood; in old abscesses it becomes unhealthy, fœtid, and alkaline, containing but few pus-cells, with abundance of granular matter. An abscess may burst in various directions, as on the surface of the brain; into a ventricle; into the tympanum; or in rare instances externally. In other cases the contents become inspissated, cheesy, or calcified, and surrounded by a firm capsule.

SYMPTOMS.—The special characters of the clinical phenomena of cerebritis, as distinguished from those of meningitis, are that they indicate but slight and brief excitement or none at all; while signs of failure of the cerebral functions speedily set in. The diffuse form is always preceded and accompanied by symptoms of meningitis, and in proportion as these are but little marked and of short duration; and the more rapidly stupor and coma, sensory anæsthesia, convulsions, and paralysis set in, the more probable is it that the brain itself is involved. Pyrexia also is not so high. Local cerebral inflammation is always very obscure at the outset. Frequently there is a severe prolonged rigor at first, which may be repeated on several days with almost regular periodicity. Sometimes, without any particular previous symptoms, the patient is seized with an apoplectic or epileptiform seizure, or gradual coma sets in; occasionally sudden hemiplegia without loss of consciousness has been observed. As a rule, however, there are early symptoms, viz., deep and sometimes fixed headache, often considerable, of a dull character, but not intensified into violent paroxysms; vertigo; heat of head; restlessness and sleeplessness; a heavy expression; mental confusion; irritability; sometimes talkative, but not violent delirium; dimness of sight; partial deafness; sensations in various parts of the limbs of tingling, numbness, formication or deep pain or coldness; general weakness and languor; with tremors, twitchings, rigidity, or paralysis of various muscles. The pupils present all possible variations. There is comparatively little pyrexia. Vomiting is not infrequent. Sometimes articulation is impaired, or the patient is disinclined to speak; or complete aphasia may be observed. The subsequent symptoms in fatal cases are stupor, ending in coma; gradual loss of all sensation; convulsions, hemiplegia, or general paralysis, usually with rigidity or tetanic spasms; and involuntary escape of urine and fæces. Some cases do not end fatally, but permanent disorder of the mental, sensory, or motor functions usually remains. In pyæmia it is rarely possible to diagnose cerebral abscess, and in some instances the symptoms closely resemble those of some low fever. Very exceptionally a collection of pus in the brain bursts externally.

CHAPTER LXXXII.

APOPLECTIC DISEASES.

It is necessary at the outset to make a few general observations with regard to what is meant by the term "apoplexy." Originally this merely implied an attack of sudden coma without convulsions, corresponding to what is now called an "apoplectic seizure, fit, or stroke;" such a seizure, however, was found to be most commonly due to cerebral hæmorrhage, and hence apoplexy came to be employed to indicate this pathological condition. Subsequently the word was extended to denote hæmorrhage into any organ, *e.g.*, pulmonary apoplexy. Strictly this is quite incorrect, and it is highly important to bear in mind that apoplexy and cerebral hæmorrhage are not synonymous, for the former may be due to other causes, and the latter does not always give rise to an apoplectic seizure. The comatose state characteristic of apoplexy is usually accompanied by other phenomena, such as an alteration in the colour of the face; slow, laboured, or stertorous breathing; abnormal states of the pupils; changes in the pulse; or paralysis; but these are extremely variable and inconstant, and therefore cannot properly enter into its clinical definition. The chief causes of an apoplectic seizure are:—1. Cerebral congestion (*congestive apoplexy*). 2. Cerebral or arachnoid hæmorrhage (*sanguineous apoplexy*). 3. Sudden anæmia of the brain, due to embolism or thrombosis of a main vessel; cardiac failure, especially from fatty disease; or probably vaso-motor disturbance, leading to spasmodic contraction of the arteries. Rarely a sudden apoplectiform attack is associated with:—4. Uræmia and other forms of blood-poisoning. 5. Sun-stroke. 6. Organic affections of the brain or its membranes, as meningitis, abscess, chronic softening, tumours. 7. It is said sudden serous effusion into the ventricles (*serous apoplexy*). The last-mentioned cause is, however, very doubtful, and the cases in which it is supposed to have occurred were probably those of uræmic poisoning, though it must be added that some believe that uræmia may lead to cerebral symptoms by causing rapid effusion of serum. 8. In extremely rare instances a fatal apoplectic attack has occurred where no morbid condition whatever could be detected at the post-mortem examination (*simple apoplexy*). The immediate cause of an apoplectic seizure is a matter of dispute. Probably it may be due to a want of proper arterial blood in the brain, whether the result of interference with its entrance, venous engorgement, or a poisoned condition of the blood; compression or actual destruction of the nerve-elements; or shock.

I. CEREBRAL CONGESTION OR HYPERÆMIA.

ETIOLOGY.—The causes of hyperæmia of the brain are:—1. General plethora, especially that associated with excessive eating or drinking, and luxurious habits with want of exercise. 2. Increased flow of blood into the brain—*active hyperæmia*—from undue cardiac action, whether merely functional or associated with hypertrophy of the left ventricle;

local irritation, especially in connection with inflammatory affections; diminished resisting power of the arteries, particularly accompanying vaso-motor paralysis, as from excessive mental labour, strong emotion, sun-stroke, or the effects of alcohol and other poisons; interference with the general arterial or capillary circulation, in consequence of which an extra amount of blood flows into the main arteries of the neck; or, it is said, atrophy of the brain. 3. Interference with the escape of blood out of the brain—*mechanical hyperæmia*—especially resulting from cardiac and extensive lung-affections; violent expiratory efforts with the glottis closed, as in coughing or straining at stool; hanging the head down; direct pressure upon the veins returning the blood from the brain, as by an aneurism or other tumour; or strangulation of the neck.

ANATOMICAL CHARACTERS.—The post-mortem appearances usually described as indicative of cerebral congestion are overloading of the venous sinuses and of the vessels of the membranes, including the finer branches as well as the larger veins, so that the pia mater appears extremely vascular and opaque; undue redness of the grey matter of the convolutions; and increased number and size of the drops of blood which are seen on making sections of the brain. The convolutions may be compressed, and the ventricles contracted. Niemeyer justly remarked that it is often difficult to decide whether the vessels of the membranes, and still more whether those of the brain-substance have been congested during life. He considered that the number and size of the drops of blood on section depend chiefly on its fluidity, and that œdema may follow congestion, the brain-substance then becoming unusually pale, and presenting but few and small blood-spots. As a rule the signs of hyperæmia are equally distributed throughout, but sometimes they are more evident in some parts than others. Long-continued or repeated congestion leads to permanent enlargement and tortuosity of all the vessels; atrophy of the brain, with a moist, slimy condition of its substance; increase in the subarachnoid fluid; and, it is supposed, hypertrophy of the pacchionian bodies.

SYMPTOMS.—Persistent cerebral congestion is revealed ordinarily by more or less of the following symptoms:—Constant dull headache, not severe, felt all over the head, or chiefly at the vertex or behind; a sense of heaviness, fulness, and oppression in the head; vertigo, which is often a prominent symptom; some degree of mental disturbance, evidenced by dulness of intellect, confusion and slowness of thought, impaired memory, indifference and indisposition for any effort or occupation, constant drowsiness, though sleep is unrefreshing and often disturbed by disagreeable dreams; photopsia, iridic colours, or specks before the eyes, or sometimes temporary diplopia or dim vision; partial deafness and noises in the head; a feeling of heaviness in the legs, especially after walking, with restlessness and fidgetiness, twitchings, or sudden startings; increased or impaired cutaneous sensibility; pains in the limbs and various paræsthesiæ, these disordered sensations being temporary and variable in their locality. These symptoms are worse after meals, mental effort or emotion, and physical exertion, as well as in the recumbent posture. There are often obvious signs of plethora about the face and head, with throbbing of the carotids.

Occasionally grave symptoms arise from cerebral congestion. The t important are those characteristic of an apoplectic attack. Various binations of symptoms may be met with, but the distinctive features is *congestive apoplexy* are as follows:—1. Its onset is quite sudden; iches its full development at once; and almost always follows some n the part of the patient which leads to increased congestion in the , such as hanging down the head, coughing, or straining at stool. he coma is rarely complete, there being usually some indications of ition, or should there be absolute loss of consciousness, this lasts a very short time. 3. There is generally partial bilateral motor ysis, very rarely hemiplegia or more marked paralysis on one side the other. 4. Rigidity is never observed, but slight bilateral c spasms are not uncommon, or they may be unilateral. 5. Respin is not stertorous. 6. The pulse is generally slow, infrequent, full. 7. There are external signs of hyperæmia about the head and 8. Urine and fæces are not passed involuntarily. 9. Restoration pid and ordinarily perfect, no permanent mental defect or paralysis otion or sensation remaining. Some degree of mental confusion be left for a time, or general impaired sensation with muscular ness, but these soon pass away. The patient may be subject to ks of this kind. Occasionally cerebral congestion gives rise to epiform seizures; and in some conditions it is attended with delirium fever.

I. CEREBRAL AND MENINGEAL HÆMORRHAGE—SANGUINEOUS APOPLEXY.

IOLOGY AND PATHOLOGY.—Cerebral hæmorrhage is in the great rity of cases, excluding those of traumatic origin, the result of tural changes in the minute vessels, which diminish their resisting r, viz., atheroma or calcification; fatty degeneration; the formaof minute aneurismal dilatations on the small arteries, associated a fibroid change; or the state of impaired nutrition which is ind by debilitating diseases, as typhus fever or scurvy. Frequently, ldition to this, the vessels are not properly supported, owing to ning or atrophy of the brain substance, and hence they are still more to rupture. Not uncommonly they give way spontaneously, but vent is far more likely to happen if a state of congestion is brought t in any way, especially as the result of hypertrophy of the left icle, excited cardiac action, or interference with the escape of l from the brain. On this account cerebral hæmorrhage is liable to v sudden effort; straining at stool; a fit of coughing; strong emohanging the head down; compression of the neck; exposure to un; a fit of drunkenness; a warm bath; or exposure of the surface e body to cold. Among *predisposing causes* may be mentioned add age; hereditary predisposition to early senile changes in the es; luxurious habits with want of exercise; and a state of general ora and want of tone. If there are signs of marked degeneration e arteries, particularly if combined with left cardiac hypertrophy or ition of the right cavities and renal disease, cerebral hæmorrhage be feared at any moment. It must be mentioned that embolism rombosis of a large vessel in the brain leads to capillary extravasation in the surrounding area. In very rare instances hæmorrhage into the brain has resulted from the rupture of a vascular tumour.

Traumatic injury is the usual cause of meningeal hæmorrhage, but blood may find its way from the brain into or beneath the pia mater, or into the arachnoid cavity. Another important cause of hæmorrhage into the meninges is the rupture of an aneurism on one of the main arteries at the base of the brain, especially on the basilar, middle cerebral, or one of the communicating arteries. Effusion of blood outside the dura mater is always due to injury.

ANATOMICAL CHARACTERS.—The situations in which blood may be found extravasated within the cranium are as follows:—1. Into the substance of the brain. 2. Within the ventricles. 3. In connection with the pia mater. 4. Into the arachnoid sac. 5. Between the skull and dura mater.

The pathological anatomy of hæmorrhage into the brain must be considered at some length. *Seat.*—This is by far most frequently the corpus striatum or optic thalamus. Occasionally blood excesses into the pons, cerebellum, medullary substance of the cerebrum, crus cerebri, medulla oblongata, corpora quadrigemina, or corpus callosum. Sometimes a part of the brain, as the septum lucidum, is torn through; or the blood makes its way into a ventricle, or out on to the surface of the brain. *Amount.*—The quantity of blood extravasated varies from a few drops to several ounces, and the effusion may be so large as to alter the shape of a hemisphere, flatten its convolutions, and cause marked anæmia around. *Number.*—As a rule there is but one extravasation, but occasionally two or more are observed, though very rarely on opposite sides. Not uncommonly remains of former hæmorrhages are seen. *Recent characters and subsequent changes.*—The blood may accumulate in the form of what is termed a *capillary hæmorrhage;* or as a distinct *clot.* The former presents numerous scattered dark-red points of extravasation in the midst of cerebral substance, which is either normal, or frequently of a yellow or reddish colour as well as softened, this condition constituting one form of *red softening.* A clot, if small, simply separates the brain fibres, but if large the cerebral tissue becomes broken down and mixed with the blood, while the surrounding portion is torn, at the same time being often softened and discoloured from imbibition. At first the blood may be quite fluid, or partially or completely coagulated into a soft clot. Subsequently it tends to set up inflammation around, and has been known even to give rise to an abscess. In favourable cases, however, the extravasation undergoes changes ending in its absorption. It separates into its fibrinous and serous portions; becomes decolorised by degrees, passing through stages of reddish-brown, brown, yellowish-brown, and yellow; or granular pigment and hæmatoidine crystals form. Proliferation of cellular tissue takes place around, forming a capsule, and the clot may in time be quite absorbed, an apoplectic cyst remaining, containing fluid, often loculated, which may also be removed ultimately, nothing being left but a firm, fibrous, pigmented cicatrix. It is even said that this may disappear, a loss of substance with diminution in the size of the brain being thus occasioned. The nerve fibres which lead from the seat of hæmorrhage to the spinal cord frequently undergo degeneration.

lood collects in a ventricle it is not nearly so readily ab-
d in many cases becomes organised. In connection with the
s an extravasation is generally spread out, and forms a soft
m. In its subsequent changes it becomes altered in colour,
nd pigmented, the brain underneath being somewhat indu-
ally it forms a depressed pigmented plate, with serum above.
rt, vessels, and kidneys will be found diseased in many cases
hæmorrhage.

s.—In a considerable proportion of cases of cerebral hæmor-
onitory symptoms have existed for a variable period, such as
or a sense of heaviness in the head; vertigo; mental con-
impaired memory; irritability; disturbed sleep or drowsiness;
vision or hearing; thickness of speech; slight or temporary
alysis about the face or limbs; local twitchings; impaired
or paræsthesiæ in various parts. These phenomena may be
re vascular disturbance; minute thromboses; or very small
ons. The frequent occurrence of epistaxis has been con-
important premonitory sign; and also the discovery by the
scope of clots in the retina. There are usually indications
ation of vessels, as well as of cardiac disease and chronic
ief in many cases.

ise clinical phenomena which result from the actual extrava-
lood into the brain differ very materially. This lesion never
lutely sudden death, though in rare instances a fatal termina-
urred within a few minutes. In the majority of cases the imme-
toms which characterise cerebral hæmorrhage may be summed
of an *apoplectic seizure* with *hemiplegia*. The main features of
re as follows:—It may follow some evident cause which leads
congestion, but often sets in spontaneously while the patient
quiet. The seizure is usually more or less sudden, though
ely so, being almost always preceded by some immediately
y symptoms, which occasionally last for some time, such as
fusion, pain in the head, disorder of speech, unilateral numb-
with faintness, or sickness. Sometimes a convulsion ushers
k. When fully developed the coma is usually very profound
the deeper it is the more likely is an apoplectic fit to be due
age rather than other cerebral lesions. The accompanying
of the comatose state in a considerable proportion of cases
eous apoplexy are flushing or even some degree of lividity,
gid condition of the face, and fulness of the veins; slow,
rregular, or stertorous breathing, with puffing out of the cheeks
on; throbbing of the carotids, the radial pulse being infre-
v, laboured, full, and soft. Sometimes, however, signs of
oticed, the face being pale, and the pulse rapid, small, and
he temperature is frequently lowered. Hemiplegia exists on
posite the lesion, having the extent described in the chapter
s, but in many instances this condition is not easy to make
t when the coma is very deep, the whole body being para-
e time. Sometimes tremors or spasmodic movements are
the paralysed limbs. The head and eyes are usually turned
-paralysed side, the patient seeming to be looking over the

shoulder on that side, and often both upper eyelids fall. The pupils vary much, but they are generally equal and somewhat dilated; sometimes they are unequal, or very large and insensible to light.

As regards the progress of the disease, the comatose state may end in death, which rarely happens under some hours, and not usually for two or three days, some cases lingering for four or five days or longer. Urine and fæces are then passed unconsciously; and secretions accumulate in the air-tubes, attended with loud rhonchal sounds. On the other hand, in a good proportion of cases consciousness is restored more or less speedily, and the mind is then found to be perfectly natural, or there is only slight mental confusion, which soon passes off. Occasionally delirium is observed; or the mental faculties may be permanently enfeebled, the patient sinking in time into a state of more or less dementia. The hemiplegia becomes evident on the return to consciousness, and when the right side is affected aphasia is common, which also occasionally accompanies left hemiplegia. Sensation is not nearly so much affected as motion usually, there being merely a certain degree of impaired sensibility or numbness and tingling in the extremities, and even these usually disappear before long. Now and then, however, permanent anæsthesia is noticed, either over the whole side or in limited spots, which is an indication of severe lesion. There is usually no complaint of head symptoms or disorder of the special senses, or if such exist, they speedily pass away unless the hæmorrhage is extensive. In a few days signs of more or less inflammation from irritation of the clot are generally developed, such as headache, heat of head, restlessness, slight delirium, disturbances of vision, and twitchings or spasmodic movements in the paralysed parts. These symptoms soon subside ordinarily, but violent inflammation may be set up, ending in extensive softening or abscess, indicated by a relapse into the comatose state, with general paralysis and involuntary evacuations before death, which event may take place from this cause in three weeks or more. Should a case proceed favourably, the motor paralysis often diminishes greatly in time, the improvement following the usual course, but the restoration is not often complete, certain muscles generally remaining permanently disabled. In other cases there is little or no improvement, and "late rigidity" may ultimately set in.

Some of the chief clinical variations due to the *extent* and *seat* of cerebral hæmorrhage will now be noticed. In the case of a cerebral hemisphere the degree and duration of the comatose state depend mainly on the amount of the extravasation. Hence, if this is moderate, there may be only partial loss of consciousness, the patient exhibiting signs of sensation and perception, while the mental faculties are very speedily and completely restored. If the extravasation is very small, there is no impairment of consciousness at all, and the lesion is merely indicated by *sudden hemiplegia;* or this is noticed when the patient attempts to move in the morning, the hæmorrhage having occurred during the night. The degree and persistence of the paralysis depend on the seat of the extravasation, as well as its extent. Thus a small effusion into either corpus striatum or optic thalamus will give rise to hemiplegia, and if it is of some size the paralysis is permanent. Dr. H. Jackson is of opinion that the arm suffers less and the leg more the further back the lesion is placed; and that when the optic thalamus is implicated, there is diminution, or, soon after the attack, loss of sensation on the paralysed side. A clot in any other part of the hemisphere may cause no symptom whatever, if of small size, and it is only accompanied with hemiplegia if it presses upon the central ganglia, and interferes with their supply of blood. Even then it is only partial, while recovery is frequently complete and rapid. Hæmorrhage into the cortical substance is usually attended with convulsions, and subsequently by marked mental disturbance, meningitis being often set up. When a very large clot occupies a hemisphere, so that the opposite one is also interfered with, bilateral paralysis is produced, though it is not equal on the two sides, only some degree of weakness being observed on the same side as the lesion. General paralysis may also result from extravasation into both hemispheres, but this is extremely rare. If there is extensive laceration of the brain, rigidity and muscular twitchings are prominent. In some cases no impairment of consciousness is observed at first, or this is only partial and of brief duration, but afterwards, owing to increase of the hæmorrhage or to the rupture of another vessel, profound coma may set in, ending in death.

Hæmorrhage into the inner part of the crus cerebri is signified by paralysis of the third nerve on the same side, with opposite hemiplegia. Ventricular hæmorrhage is attended with profound coma and general paralysis, as well as in some cases with convulsions or marked rigidity and twitchings; or more commonly these symptoms follow the signs of hæmorrhage into one hemisphere, which is very significant. Cerebellar hæmorrhage has exceedingly indefinite indications. Very urgent vomiting; severe pain at the back of the head; and hemiplegia without implication of the face and tongue, have been considered its most characteristic signs. There may or may not be loss of consciousness. If either crus cerebelli is injured, one eye is turned up and out, the other down and in. Considerable extravasation into the middle of the pons varolii causes profound coma; general paralysis; marked contraction of both pupils; and usually speedy death. The condition greatly resembles that accompanying opium-poisoning. When the effusion takes place into one half of the pons the facial, fifth, and sixth nerves may be paralysed on the same side as the lesion, along with paralysis of the limbs on the opposite side; or if a certain part is involved, both facial nerves are affected. Sensation is also frequently much impaired. Hæmorrhage into the medulla oblongata generally proves very rapidly fatal. When blood escapes into the arachnoid sac or sub-arachnoid space, the attack is usually not so sudden, but the symptoms are very variable. At first premonitory symptoms are frequently present, as severe headache, vertigo, partial loss of motion, somnolence, or impairment of intellect. Among the signs which may be considered as most suggestive of this form of hæmorrhage are gradually-developed coma; hemiplegia without implication of the face, or paralysis beginning on one side and afterwards extending to the opposite one; the occurrence of convulsions, marked spasmodic contractions, or rigidity of the limbs; and the supervention of signs of severe meningitis in a few days. Sensation is rarely affected. When meningeal hæmorrhage is considerable, it may be impossible to distinguish it from extravasation *into* the brain.

III. CEREBRAL EMBOLISM AND THROMBOSIS—SOFTENING.

ETIOLOGY AND PATHOLOGY.—The pathology of softening of the brain is much disputed, but I propose to treat of this morbid condition in connection with embolism and thrombosis, because it seems to me certain that softening is in the great majority of cases due to vascular obstruction thus induced. A cerebral embolus of any size generally has its origin in valvular disease of the heart, but it may come from an aneurism or a pulmonary thrombus. Minute emboli may also be detached from old clots, or from the inner surface of diseased vessels. The formation of thrombi is almost always associated with degeneration of the cerebral vessels, which, however, may be aided by a feeble state of the circulation, and certain conditions of the blood.

The main pathological causes to which the different forms of cerebral softening have been attributed may be summarised thus:—1. Local inflammation of the brain-substance. 2. Obstruction of arteries or capillaries by emboli; of arteries, veins, or venous sinuses by thrombi. 3. Pressure upon a main artery by a tumour. 4. A diseased condition of the walls of the small arteries and capillaries, narrowing their calibre, and interfering with the nutritive relation between the blood and tissues. 5. Diminished nutritive activity in the tissue-elements, leading to their degeneration. 6. Effusion of blood into the brain. 7. A peculiar chemico-pathological change in the brain-substance, attended with the liberation of phosphine, and one or more of the fatty acids. This form of softening is said to be often observed around adventitious products and old clots, but occasionally is independent of these (Rokitansky). 8. Œdema of portions of the brain. 9. Atrophic softening, due to separation of nerve-fibres from their ganglionic communications. I have already expressed my own view as to embolism and thrombosis being by far the most frequent cause of cerebral softening, the nutrition of the part thus deprived of blood being impaired, sometimes to such a degree as to cause its actual death, œdema and capillary hæmorrhage also in some cases contributing to the process of softening. It must not be forgotten that the brain may become softened as the result of a post-mortem change. With regard to *predisposing causes* of cerebral softening, this lesion is most common in advanced age, on account of the condition of the vessels, but when due to embolism it may be met with in young adults or even in children. Excessive and long-continued mental strain undoubtedly aids in its production, and it is by no means improbable that this may so disturb the balance of nutrition as of itself to give rise to softening.

ANATOMICAL CHARACTERS.—An embolus may lodge in one of the arteries before reaching the circle of Willis, and then, owing to the collateral circulation being readily set up, no permanent evil consequences ensue. Almost always, however, it passes into a branch beyond this, most frequently the *middle cerebral artery*, especially the left. The immediate result is anæmia of the portion of the hemisphere which this artery supplies, and as its anastomoses are not abundant, this is followed by softening with œdema, while there is a determination of blood into the surrounding capillaries, which often give way, giving rise to capillary hæmorrhage, especially at the circumference of the affected part. The effects may partly disappear in course of time in young persons whose vessels are healthy and distensible, and it is not improbable that the consequences of embolism in the minute vessels are often recovered from. After an embolus has been lodged for some time, it may be difficult or even impossible to discover it.

In arterial thrombosis the vessels will generally be found extensively diseased, many of them being usually blocked up. This condition will also lead to anæmia and softening, but owing to the morbid state of the minute vessels and to several of them being obstructed, there is no increased vascularity around the affected part as a rule, this being very pale, while if a vessel of any size is obstructed, for the same reasons restoration cannot be expected. Thrombosis of the veins and sinuses are generally associated with inflammation from injury or bone-disease. It may arise, however, from feebleness of circulation with blood-changes, the thrombus first forming in the superior longitudinal sinus and then extending, leading to more or less effusion of serum into the ventricles and sub-arachnoid space, or rarely even to hæmorrhage here or into the brain-substance, but especially to scattered patches of red softening with capillary hæmorrhages in the grey matter of the convolutions, or occasionally more extensive softening.

Three chief forms of cerebral softening are described, viz., *red*, *yellow*, and *white*, but the softened part may present numerous varieties of these tints, or other colours, such as brown or greenish. The degree of diminution in consistence varies from what is scarcely appreciable to that of almost a fluid pulp. It is determined by touch; or by allowing a piece cut out of the softened part to stand, and observing how soon the angles round off, or pouring a gentle stream of water upon it. The seat and extent of softening vary greatly, and very different statements have been made as to the frequency with which different parts of the brain are involved, but the usual seats seem to be the corpus striatum, optic thalamus, central white matter of the hemisphere, and convolutions. In embolic softening the left hemisphere is most commonly affected. The morbid condition is rarely well-defined, but shades off into the surrounding brain-tissue. A section appears swollen, and often rises above the surrounding level. A highly important character of all forms of cerebral softening, except, it is said, the inflammatory, is that the specific gravity of the softened part is considerably below that of normal brain-substance. Microscopical examination reveals more or less destruction of the nerve-elements, until in extreme cases no trace of them is left; abundant granular cells, not of inflammatory origin, but chiefly derived from granular degeneration of the cells of the neuroglia or of nerve-cells; granular fatty débris; particles of myeline; blood-cells in some varieties, or their remains in the form of pigment and hæmatoidine crystals. The capillaries often show signs of degeneration, and are in some forms dilated or present little aneurismal swellings.

It is necessary to offer a few remarks respecting the three main forms of softening. *Red softening* may be inflammatory in its origin, but in the great majority of cases it depends upon obstruction of large arteries or venous sinuses. The tint at first may vary from pink to deep claret, being most intense in the grey matter. Afterwards it undergoes changes, assuming different hues of yellow, brown, chocolate, buff, &c. *Yellow* *softening* usually results from changes in the red variety, but the peculiar form due to the chemico-pathological change is described as being of this colour. *White softening* is considered by some pathologists as the ultimate condition of the red, but undoubtedly it is not uncommonly a primary form, especially in connection with extensive thrombosis and atheroma of the vessels. It is also observed in œdematous and atrophic softening.

Reparative processes may be set up after softening. On the surface of the brain circumscribed yellow patches—*plaques jaunes*—are produced, of tough consistence, implicating the grey matter of the convolutions. In the interior of the organ a cavity forms, bounded and traversed by a white or greyish or sometimes yellowish vascular connective-tissue, which may divide the space into loculi, and these contain a milky fluid holding in suspension abundant fat granules and corpora amylacea. This fluid may be absorbed, contraction and ultimate closure of the cavity subsequently taking place.

SYMPTOMS.—It will be requisite in treating of the clinical history of cerebral softening, to describe it under the two forms of *acute* and *chronic*. The latter is considered in the chapter on Chronic Diseases of the Brain.

Acute softening.—Practically it will only be necessary here to indicate the respective symptoms of *embolism of the middle cerebral artery* and *thrombosis*. Embolism may occur at any age, being not uncommon in young persons; some morbid condition likely to originate an embolus can generally be discovered; while in most cases no premonitory head symptoms have been noticed. The usual indications of the lodgment of the embolus are sudden loss of consciousness and evidences of shock; with hemiplegia, generally on the *right* side. The case may end fatally, or consciousness may return, but the hemiplegia remains, aphasia being also very frequent. The paralysis is rarely recovered from entirely, but power may be partially restored, especially in young persons. In one case which came under my notice the leg recovered perfectly, but the arm, face, and tongue remained permanently paralysed.

Arterial thrombosis is met with either in old persons or in those who are prematurely aged; and usually, but not always, well-marked signs of degeneration of the vessels of the limbs are obvious, along with a feeble heart and other evidences of decay. Commonly there have been marked premonitory symptoms, due to interference with the cerebral circulation or the formation of minute thrombi, as described under Cerebral Hæmorrhage. The mode of attack varies, but is usually more or less apoplectiform. Should a large artery or several smaller vessels be suddenly obstructed, a sudden apoplectic seizure with hemiplegia occurs, frequently not distinguishable from sanguineous apoplexy. By far more commonly, however, the onset is gradual, there being marked mental disturbance of some kind before the coma supervenes, such as transient excitement, confusion of thought, irritability, or mild delirium, the patient often talking incoherently or acting strangely. There may be complete loss of consciousness for a brief period, but this condition soon passes away, and almost always when the patient is seen the coma is only partial, indications being afforded that sensation and perception are not entirely abolished. In some cases apoplectiform attacks are repeated, with partial restoration in the intervals, absolute coma being ultimately developed, with general paralysis and involuntary passage of fæces and urine, death taking place in a few days. In others the mental faculties become by degrees considerably improved, even up to the previous standard; but as a rule the intellect remains markedly impaired, and this condition tends to become speedily worse and worse. There is frequently permanent aphasia or defect of speech. When sufficiently restored, the patient often gives indications of pain or uneasiness in the head; and of hyperæsthesia, dysæsthesia, or various paræsthesiæ in either or both limbs on one side. Hemiplegia is usually present, and during the apoplectic condition the head and eyes are often turned to the sound side. Sometimes the paralysis is bilateral or confined to one limb. Generally it is not complete, being also more marked in the arms than the legs, and at the extremities of the limbs than in other parts. Early spasmodic contractions in the paralysed part are very common, in the way of clonic spasms, jerkings, or rigid flexion of joints, especially of the shoulder, elbow, and knee. The affected limbs are often exceedingly irritable on percussion. The paralysis is not likely to diminish. Hemiplegia without loss of consciousness is far more common in thrombosis than in cerebral hæmorrhage, and the paralysis may come on in a progressive manner, which is very characteristic, affecting first one limb and then the other, at the same time becoming more marked by degrees. Occasionally the early symptoms assume the characters of irregular epileptiform attacks occurring in rapid succession, attended with mental disturbance, ending in coma and hemiplegia. In other in-tances delirium is the prominent symptom at first, usually mild, some-mes violent, alternating with and finally ending in coma. The subse-uent course of cases of acute softening varies much; many of them ecome very chronic, the patient gradually sinking into a state of im-ecility, and being permanently bed-ridden and helpless; the opposite de often becoming weak; "late rigidity" setting in in the paralysed uscles; and nutrition being much impaired.

CHAPTER LXXXIII.

CHRONIC DISEASES OF THE BRAIN AND ITS MEMBRANES.

I. CHRONIC MENINGITIS.

ÆTIOLOGY.—Chronic meningitis is chiefly met with as the result of ormer injury to the skull; prolonged mental labour, especially if combined with much anxiety; chronic alcoholism; and irritation by tumours nd morbid deposits, especially syphilitic. In rare instances it remains fter the acute disease. It is by far most common after middle age, nd in males.

ANATOMICAL CHARACTERS.—The most frequent post-mortem signs f chronic meningitis are thickening and increased firmness of the

clear or flocculent serum in the ventricles, the
which becomes thickened and rough. Calcareou
may be formed in the thickened membranes, and
the brain are sometimes atrophied. Increase in
ment of the Pacchionian bodies has been consider
meningitis.

SYMPTOMS.—These are often very obscure and
combination of symptoms due to excited action a
of the parts involved. The most important are :—
stant general headache, of dull and heavy char
attended with exacerbations. 2. Persistent vertig
ing while walking, as if drunk, but particularly
round over the shoulder. 3. Mental excitability a
the evenings, with peevishness, irritability, restlessn
alternating with marked depression, the patient
gloomy, low-spirited, and apprehensive. 4. In c
of the intellectual faculties, sometimes ending i
5. Subjective sensations of flashes of light, iri
aurium; with at the same time diplopia or mor
of sight in one eye, or partial deafness. 6. Hy
part of the skin, with hypæsthesia or numbnes
7. Irregular twitchings or clonic spasms of vario
those of the face and eyeballs, causing grimace
strabismus; also of the muscles of the limbs, which
spasmodic movements from time to time, or ri
motor paralysis, usually incomplete, accompanyin
above movements, affecting first the cranial ner
sides, as indicated by partial ptosis, drawing of t
strabismus or immobility of the eyeball, slight dev
and thickness of speech; then extending to the l
only a few fingers or certain muscles being inv
whole arm, one arm and leg, or sometimes all the

II. Chronic Cerebral Softening.

Symptoms.—It is only requisite to describe here the clinical history
softening which is chronic from the commencement. Its chief symp-
ns are:—1. Headache in many cases, persistent but not severe;
ally of heavy character, and sometimes only amounting to a feeling
weight and heaviness; frontal as a rule, occasionally general, but
er unilateral or localised. 2. Mental changes, viz., gradual failure
he intellectual faculties one after another, of which the patient is
erally aware at first, which may ultimately end in complete dementia
mania; change in manner, disposition, and temper; various forms
degrees of aphasia, a tendency to repeat the same words several
es and on all occasions being considered very characteristic; marked
ness of spirits; emotional disorder, the patient being either apathetic
he emotions being but little under control, and quasi-hysterical fits
rying or laughing occurring without cause; sometimes a restless and
ited manner at night, or even mild delirium. Occasionally the mind
ns unaffected. 3. Sensory disorders, especially superficial and deep
ns in various parts of the limbs, hyperæsthesia or dysæsthesia, formica-
, numbness, and gradual impairment of sensation, seldom amounting
omplete anæsthesia; some degree of failure of sight and hearing, but
ly complete blindness or deafness. 4. Motor disturbance, in the way
aralysis, incomplete in degree and developed gradually, and often in
ntermittent manner, usually beginning in either arm or leg, but soon
ng more or less generally but irregularly distributed, though one side
s a rule more affected than the other, or sometimes confined to
cial groups of muscles, such as those of the face or part of a limb;
uently tonic rigidity, gradually increasing; tremors or clonic spasms,
ecially in the paralysed muscles, with undue irritability on percus-
n; and sometimes epileptiform convulsions. The subjects of chronic
ening commonly present an old or prematurely aged, unhealthy,
hectic appearance. Degeneration of the vessels, weak heart, and
nular kidneys are frequently well-marked. Usually the bowels are
tinately constipated. The duration of the disease is very variable.
last gradual coma sets in, usually with general paralysis and relaxa-
n of the muscles, and involuntary passage of urine and fæces.
edy and unexpected death may happen from extensive thrombosis
æmorrhage.

. Adventitious Growths in connection with the Brain and its Membranes—Cerebral Tumour.

NATOMICAL CHARACTERS.—The chief cerebral adventitious growths
umours include:—1. Cancer. 2. Tubercle. 3. Syphilitic deposit.
arcoma. 5. Myxoma. 6. Glioma. 7. Cholesteatoma. 8. Lipoma.
Parasitic cysts, viz., cysticercus cellulosus and hydatids. 10. Cysts
taining fluid, fat, or hair; or presenting cauliflower excrescences.
Aneurisms. 12. Vascular erectile tumours. 13. Osseous or cal-
eous masses. Only the anatomical characters of the first three will be
cribed here.

ancer.—All forms of malignant disease are met with, but far most commonly encephaloid, which usually occurs as a more or less round or lobulated tumour of very variable size, generally single if primary, sometimes numerous if secondary. The growth may be inseparable from the brain substance; distinctly defined; or surrounded by a cyst. The usual seat of cancer in the brain is the cerebral hemisphere, but it may occupy any part. It often shows signs of degenerative changes in its interior. It must be mentioned that cancer may originate from other structures within the cranium besides the brain itself, and then tends in some cases to make its way outwards; on the other hand it may begin outside the skull and grow inwards.

Tubercle in the brain is described as forming irregularly-roundish masses, yellow and caseous-looking, dry and bloodless, sometimes continuous with the brain-substance through a greyish-white somewhat translucent border, in other cases separated by a cyst. As a rule there is but one such mass, occasionally two, rarely more. The size generally varies from that of a hemp-seed to a cherry, but it may be equal to a small egg. Tubercle ordinarily occupies the cerebrum or cerebellum, rarely the pons. It often softens in the centre into a purulent-looking fluid, or an actual cavity may form.

Syphilitic disease.—Syphilitic deposit is far more commonly met with in connection with the membranes than in the brain itself. These are matted together, the dura mater being closely adherent to the skull at the seat of disease, and the inner membranes to the cerebral substance, while there is more or less thickening from the accumulation of a tough material, yellow in the centre, but usually presenting a greyish-white border around. This often involves some of the nerves. In the brain syphilis generally causes mere induration from interstitial proliferation of cellular tissue, especially at the surface. Gummata are extremely rare; they assume the form of irregular nodules or tumours, which may attain the size of an egg, their shape being often modified by the part of the brain in which they occur, and they always pass gradually into the surrounding tissue by a greyish softer material or by indurated infiltration. A section is yellowish-grey or yellowish and translucent; cheesy or gluey in consistence; and often presents signs of decay in the form of opaque spots scattered over the entire surface, but there is no central softening such as is observed in tubercle. The more vascular parts of the brain are the usual seats of syphilitic gummata. Generally there is only a single deposit.

SYMPTOMS.—There is no disease of the brain in which the symptoms are more diverse in their characters and course than in the different kinds of tumour, so much depending on situation, size, shape, number, and rapidity of growth. Further, the symptoms are not only due to the mechanical effects of the tumour, but those of softening, hydrocephalus, and chronic meningitis are often added after a time.

Occasionally a tumour, even of considerable size, is quite latent throughout; or a sudden apoplectic attack, the result of congestion or hæmorrhage, reveals its existence. The characteristic clinical features of a cerebral tumour, however, are as follows:—1. Headache, at first slight, but by degrees becoming very severe; often localised, though not necessarily over the seat of the tumour; constant, and of dull grinding character, but subject to violent exacerbations, which may be accompanied ith obstinate cerebral vomiting, the pain being often increased by any citement, coughing, sneezing, a deep breath, or strong light. Marked vertigo or a peculiar dizziness on movement in some cases. Absence of any mental disturbance in uncomplicated cases, unless a mour is very large or rapid in its growth, or that several are scattered rough the cortical substance. 4. Signs of irritation followed by adual paralysis of such of the cranial nerves as the growth implicates, ese being generally unilateral. Vision is often affected, terminating complete blindness, and it is not uncommon for one eye to be in- lved after the other. Smell and hearing may also be impaired or t, the latter usually on one side. Severe neuralgic pains, hyperæsthe- , and paræsthesiæ frequently affect the fifth nerve, followed by gradual s of sensation to complete anæsthesia, and paralysis of its motor rtion occasionally. The facial nerve is most commonly implicated; xt the third and sixth; and sometimes the fourth, there being first itchings and spasmodic movements, followed by paralysis of the iscles supplied by these nerves; when the paralysis is complete elec- irritability becomes usually quite extinct. Partial paralysis of the hth and ninth nerves is not uncommon, causing impairment of speech d deglutition, or sometimes disturbance of respiration or cardiac ion. 5. Disorders of sensation and motion in the limbs. These are, present, as a rule of more or less hemiplegic distribution, and are served on the side opposite that on which the cranial nerves are impli- ed. Rarely they are bilateral, or may be very limited. At the outset ns of irritation are observed, followed by gradually progressive para- is, which is accompanied with spasmodic movements or rigidity. ctric irritability is not lost in the limbs. When a tumour occupies interior of one cerebral hemisphere, there may be pure hemiplegia. ileptiform convulsions are not uncommon, the convulsive movements ng frequently localised mainly in some particular part. When a nour occupies certain portions of the brain, peculiar rotatory and er movements are observed. The important ophthalmoscopic signs cerebral tumour are those of ischæmia; descending neuritis; or ophy of the disc. Occasionally a tumour becomes evident extern- . In cases of aneurism, it is said that a murmur has been occa- nally heard. The general condition of the patient varies much. e constitution is affected gravely, should there be much suffering h loss of sleep. Sometimes considerable emaciation and marasmus, evidences of some cachexia are observed; or cancerous, syphilitic, tubercular deposits may be discovered in other parts. The mode in ich cases of cerebral tumour terminate is very variable. In those ich have come under my observation the end was always unexpected, te symptoms setting in without any obvious cause.

IV. CHRONIC HYDROCEPHALUS.

TIOLOGY AND PATHOLOGY.—Chronic hydrocephalus is characterised accumulation of fluid either in the ventricles; in and beneath the chnoid; or in both these situations. In the great majority of cases condition is either congenital or shows itself within six months after h, and has then been chiefly attributed to arrest of development of the brain; or to chronic inflammation of the ventricular lining membrane. It may come on as an acquired complaint, however, in older children, or very rarely even in adults, being then the result of closure of the venæ galeni, usually owing to pressure by a tumour. Chronic hydrocephalus has no connection with tubercle, but is not uncommon in rickets. Excess of fluid may accumulate in the arachnoid in connection with senile or other atrophy of the brain; or after previous hæmorrhage.

Anatomical characters.—The quantity of fluid varies from a few ounces to several pints. It is usually watery, limpid, and colourless; of low specific gravity; and contains but a very small quantity of albumen, with some saline matter. The ventricular lining membrane is often altered in appearance, thickened, granular, and rough. The arachnoid is stretched, and signs of chronic meningitis are often observed about the base. The brain is altered in shape, sometimes unsymmetrical, its convolutions being flattened and spread out; and its texture is in many cases firmer than natural, or, on the other hand, soft and macerated. The optic nerves are usually much stretched. The cranial bones are frequently expanded and thinned, the fontanelles and sutures being considerably widened; sometimes the bones are thickened but spongy.

Symptoms.—Only the signs of chronic hydrocephalus as it is met with in children need be considered here. The head enlarges, in some cases to an enormous size, so that it falls from side to side if not supported; and at the same time assumes a curious shape, becoming round and globe-like, with a very large and prominent forehead, the bones being driven apart, while the orbital plates of the frontal are pushed down, especially behind, the eyeballs being thus pressed forwards so as to become very prominent and to look downwards. The fontanelles and sutures are widened to a variable degree as well as prominent, while frequently distinct fluctuation can be felt. The scalp feels thin, sometimes almost as if it were going to give way, and the bones may be so attenuated as to yield a crackling sensation. The lower part of the face looks very small, and has a curious worn or stupid expression. It may present a puffy appearance, with enlarged vessels on the cheeks. The nervous symptoms which are liable to be met with are headache, though this is often absent; vertigo; non development or gradual failure of the mental faculties even to complete imbecility; disturbed sleep at night, with drowsiness by day; marked peevishness, irritability, or depression of spirits; failure of the special senses, especially that of sight, with signs of ischæmia or atrophy of the disc; restlessness, with general muscular weakness and loss of co-ordinating power, tottering gait, tremors of the limbs, spasmodic movements or convulsions coming on without any obvious cause, strabismus, or laryngismus stridulus. The body is generally much wasted; circulation is feeble; and the child always feels cold. Excessive appetite, vomiting, and constipation with unhealthy stools are common symptoms. The duration of these cases is variable, but usually death occurs within the first few years of life, chiefly trom gradual or sudden coma; exhaustion; convulsions; or laryngismus.

V. Hypertrophy of the Brain.

Only a few remarks are required concerning the so-called hypertrophy of the brain observed in children. This is associated either with rickets or congenital syphilis, and the increase in size and weight is probably due either to albuminoid infiltration of the white substance or to increase in the neuroglia. The tissue becomes unusually firm, pale, and dry; the convolutions being compressed, flattened, and closely packed. The head expands, but the enlargement is distinguished from that of chronic hydrocephalus by being much less rapid in its progress, never attaining any great size, and by having an elongated form from before back; while the fontanelles and sutures are not at all or but little apart, the former being often depressed and not fluctuating; and the eyes are sunken. Frequently there are no evident symptoms, but if the head is closed before the brain enlarges, serious symptoms are liable to arise, such as severe headache, vertigo, mental failure, epileptiform attacks, paralysis, or coma.

Chapter LXXXIV.

DISEASES OF THE SPINAL CORD AND ITS MEMBRANES.

Clinical Characters.—The symptoms of affections of the spinal cord differ very considerably according to the seat and extent of the disease. For instance, it may be involved high up or low down; at a limited spot or extensively throughout its length; in its entire thickness or only along one or more of its tracts. A knowledge of the physiology of the cord will readily explain these clinical variations. The usual indications of disease of the spinal cord are:—1. Local morbid sensations; or occasionally evident objective changes. 2. Sensory and motor derangements involving both legs and the lower part of the trunk, there being often complete sensory and motor paraplegia, with marked derangement as regards reflex and electrical phenomena, and a tendency to rapid failure of nutrition. 3. Paralysis of the bladder and rectum. 4. Sexual disorder, in the way of constant priapism, or loss of sexual desire or power. If the cord is involved at its upper part, the entire trunk as well as the arms are implicated, while respiration becomes more or less disturbed. When only the posterior columns are affected, co-ordinating power over the muscles is lost. Mental disturbance or obvious signs of interference with the functions of the cranial nerves are not observed unless the disease extends to the brain, but there may be difficulty of deglutition, mastication, or speech in some forms of disease implicating the summit of the cord.

I. Acute Spinal Meningitis.

Etiology.—The causes of this disease are:—1. Traumatic injury. 2. Caries of the vertebræ. 3. Exposure to cold and wet, especially local; to sudden changes of temperature; or to powerful direct heat over the spine. 4. Acute rheumatism very rarely. 6. Adventitious deposits and tumours, especially syphilitic. 6. Tetanus, chorea, or hydrophobia, it is said. 7. Epidemic cerebro-spinal meningitis. 8. Extension from cerebral meningitis.

Anatomical characters.—The post-mortem appearances resemble more or less those of cerebral meningitis. Usually the membranes are extensively affected, the pia mater being very vascular, infiltrated, and thickened. A soft exudation often covers its surface, as well as that of the arachnoid, while fluid occupies the sub-arachnoid space, either turbid and flocculent, or more or less puriform in appearance. This may be so abundant as to distend the dura mater considerably. The latter is frequently reddened, and fluid may accumulate between it and the bones, or it may exhibit signs of local injury or irritation.

Symptoms.—Acute spinal meningitis is characterised at the outset by signs of irritation of the roots of the spinal nerves, followed by those of paralysis. The early symptoms are severe paroxysms of pain along the spine, but only coming on when the patient moves; tenderness on deep pressure, though not very marked as a rule; pains shooting from the spine into the limbs and trunk, but especially the legs, though sometimes they may be chiefly felt in the arms or even in one arm if the inflammation is limited; some degree of hyperæsthesia; contraction of the muscles of the neck and back, which may cause opisthotonos, usually regarded as being due to tetanic spasm, but also considered as an instinctive act to avoid pain; fits of painful spasm in the limbs, neck, and back, with involuntary startings and jerks, but not the powerful spasms observed in tetanus; some embarrassment of breathing, which is considerable if the respiratory muscles are affected with spasm, being then attended with a sense of oppression and suffocation; occasionally some difficulty of mastication and deglutition; and irritability of the bladder. The attack may be ushered in with a chill, followed by slight pyrexia. The patient is usually very restless, anxious, and sleepless, but there are no head-symptoms. Afterwards muscular weakness is observed, beginning below and extending upwards, with partial loss of power over the bladder and rectum. In fatal cases death may occur from implication of the cerebral membranes; or from the cord being compressed by inflammatory products, or becoming itself inflamed.

II. Chronic Spinal Meningitis.

But little is definitely known about this morbid condition. It is chiefly met with in connection with bone-disease and adventitious growths, especially syphilitic. Anatomically it may be revealed by thickening, induration, and roughness of the membranes; remnants of old inflammatory products; adhesions or bands passing across the sub-arachnoid space; and sometimes calcareous deposits. Syphilitic growths present characters similar to those in the cerebral membranes.

Symptoms.—These are described as slight pain over some part of the spine; severe pains in the limbs, of a rheumatic character; paræsthesiæ in the legs, with gradually increasing hypæsthesia, but not complete anæsthesia; slight spasmodic movements in the limbs followed by paralysis, beginning in the lower extremities and gradually extending upwards to the trunk, bladder, rectum, or even to the arms, at first slight but increasing very slowly, persistent but subject to marked variations in its course. Ultimately there are all the signs of destruction of the cord.

III. Acute Myelitis—Inflammation of the Cord.

Etiology.—Acute myelitis may result from caries of the spine; injuries, including also severe strain and concussion; irritation by adventitious growths or clots; cold; or direct exposure to powerful heat. It has also been attributed to suppression of perspiration or of chronic discharges; the sudden cure of a chronic skin disease; or sexual excess.

ANATOMICAL CHARACTERS.—Inflammation of the cord usually begins in the central grey matter, and may either extend along this from one end to the other, or be confined to one or more portions of the cord, spreading throughout its entire thickness, especially opposite the lumbar enlargement. The affected tissue is generally much softened, often of cream-like consistence; more or less reddened at first, but afterwards may be yellowish; swollen and relaxed, the entire cord sometimes presenting a distended appearance or being nodulated on the surface, and the central grey matter having lost its contour. Sometimes small extravasations of blood are observed. Very rarely an abscess forms. The microscope reveals broken-down nerve elements, granules, blood-cells, and granular or pus-corpuscles. There is always more or less meningitis. A form of acute myelitis is described in which the cord becomes indurated, owing to fibrinous exudation. This has been considered by some pathologists as always preceding softening; by others, probably more correctly, as being the result of a less acute process.

SYMPTOMS.—Myelitis is characterised by the absence of the signs of irritation of the nerves observed in meningitis; with rapid development of those indicative of destruction of the cord. Its special symptoms are described as slight pain over the spine, usually circumscribed, not increased by movement or moderate pressure, but intensified by kneading, and especially by applying a hot sponge or ice, which produces a burning sensation at the upper limit of the inflammation; a feeling of constriction around some part of the trunk, as if it were bound by a tight cord; marked paræsthesiæ in the limbs and trunk, but especially in the legs, such as tingling, formication, furriness, numbness, or subjective coldness, speedily followed by paraplegic or more extensive hypæsthesia or anæsthesia; marked restlessness, followed rapidly by muscular paralysis below the seat of inflammation, therefore usually paraplegic; loss of power over the bladder and rectum, not uncommonly accompanied with great irritability, the patient desiring to have the catheter passed very frequently; and constant priapism. In the paralysed parts electric sensibility and contractility are usually impaired or lost; so as a rule is reflex excitability, but should the portion of the cord below the seat of inflammation be healthy, this is exaggerated. When the myelitis extends high up, respiration is more or less impeded, the voice is weak, and there may be dysphagia or difficulty of speech. There is little or no fever. The disease may either soon terminate fatally, or pass into a more or less chronic condition. Occasionally the inflammation is limited to one-half or to certain tracts of the cord, and the symptoms will be limited accordingly.

IV. CHRONIC MYELITIS—WHITE SOFTENING.

ETIOLOGY AND PATHOLOGY.—Softening of the spinal cord may have its origin either in acute or chronic myelitis; gradual pressure upon it; injury; or failure of nutrition from degeneration of its vessels. The softened cord is quite white in the degenerative form, or it may present a more or less red or yellowish colour. Abundant granular corpuscles and granules are visible under the microscope.

SYMPTOMS.—If the cord becomes gradually diseased, the signs of the change are more or less of the following character:—Dull pain or uneasiness over some portion of the spine, increased by pressure, percussion, the application of a hot sponge or cold, but not by movement; a feeling of tightness round the body; distressing paræsthesiæ, wandering pains, or fidgety sensations in the legs, followed by gradual loss of feeling to complete anæsthesia, this often extending up the body to a variable extent; twitchings, spasmodic movements, and cramps in the legs, with diminished power, dragging of the legs in walking, and a sense of heaviness and fatigue, ending in paraplegia; frequently a strong tendency to painful contractions and rigidity in the paralysed limbs, the legs being in many cases drawn up involuntarily if left to themselves, sometimes by jerks, so that the joints become strongly flexed, or one or both limbs being rigidly extended; increased reflex and electric irritability in the paralysed limbs, provided the disease has not extended down to the roots of the nerves, but if these are involved the irritability is impaired or lost; rapid tendency to wasting of the muscles of the legs, with failure of circulation and nutrition, the skin being often covered copiously with dried epithelium scales, and bedsores being very liable to form; paralysis of the bladder, leading to retention, decomposition of urine, and consequent cystitis; paralysis of the rectum, with unconsciousness of the passage of stools; gradual loss of sexual power and inclination, though there is often reflex priapism. In rare instances the cord may become so extensively diseased as to give rise to general paralysis, with marked wasting of the muscles, and loss of electric irritability.

V. SPINAL CONGESTION.

This condition is supposed to be characterised by the sudden onset of incomplete spinal symptoms, which afterwards disappear but are liable to recur, viz., some dull aching along the spine, increased by heat, but not by movement or pressure; aching pains in the limbs, with variable paræsthesiæ, such as tingling in the toes and fingers, numbness, or sometimes hyperæsthesia, but no anæsthesia; twitchings in the limbs, with partial loss of power in the legs or sometimes in the arms, often unequal on the two sides, there being no evident alteration in reflex irritability or in electric irritability or sensibility, or any tendency to wasting or other signs of impaired nutrition. The bladder and rectum are not involved. Slight motor and sensory disturbances accompany persistent mechanical congestion of the cord, such as that which results from chronic heart disease.

VI. SPINAL HÆMORRHAGE.

Blood may escape into the cord itself; between the membranes; or outside the dura mater. Injury is by far the most frequent cause, but occasionally a vessel gives way spontaneously.

SYMPTOMS.—1. *Into the spinal cord.*—This is evidenced by sudden acute pain in the back, with signs of severe shock to the system, the patient

:n unconscious for the time; complete and permanent paralysis
ı and sensation in the legs or more extensively, according to
f mischief; paralysis of the bladder and rectum; and priapism.
ıditions are usually permanent. 2. *In connection with the mem-*
[f the hæmorrhage is abundant the symptoms are as above; but
dications of sudden severe irritation are first observed, in the
inful sensations shooting from the spine, hyperæsthesia, painful
: movements in the limbs, opisthotonos, or even strong con-
ovements; followed by paralytic symptoms.

VII. ADVENTITIOUS GROWTHS IN THE CORD.

; tumours have been found in connection with the spinal cord,
r, syphilitic deposit, and tubercle are the most important. The
ptoms include localised pain in the back, especially in connec-
cancer; neuralgic pains shooting from this point into the limbs
due to irritation of the nerves, with paræsthesiæ, followed by
a if the cord becomes destroyed; muscular disturbance fol-
paralysis, in some cases beginning on one side and extending
to the other. There may be objective evidences of a tumour
l examination. If the growth is in the cord itself, there will
radual loss of its functions up to the level of the part involved.
ıse of syphilitic disease the symptoms often improve greatly
, disappear under appropriate treatment, owing to removal of
it. Signs of some cachexia may be present; or of morbid
ı other parts.

VIII. LOCOMOTOR ATAXY—TABES DORSALIS.

·GY.—The *exciting causes* of locomotor ataxy are very obscure.
en chiefly attributed to exposure to cold and wet, especially
nbined with fatigue, as from lying on damp ground after
; injury; syphilis; and venereal excess or masturbation. It is
st common among males; and most cases occur between 35
:ars of age. Hereditary predisposition is said to exist occa-

MICAL CHARACTERS.—The lesion which gives rise to locomo-
is localised mainly in the posterior columns of the cord.
dergo a peculiar degeneration, which begins close to the pos-
ure, and then spreads laterally, so as partly to implicate the
ua. In the early stage the columns appear grey or greyish-red,
lucent, and softened. Microscopic examination reveals that
-elements are more or less atrophied or have disappeared
heir place being occupied by new connective-tissue developed
neuroglia, exhibiting abundant nuclei, fine granules, and fat,
ew granular cells. The posterior roots of the nerves also
imilarly altered. The change may advance gradually upwards
rain. In time the new tissue replaces all the nerve elements
opes into filaments, so that the cord and nerves become more
nuch atrophied and shrunken, altered in shape, and indurated
ed. The membranes covering the back of the cord are impli-
ime, and its entire thickness may become diseased.

vision at times or even complete amaurosis ; di
or ptosis ; atrophy of the disc or chronic neu
ment. It is said that sexual desire is usually incr
observed that there is in the early period a pecu
sexual intercourse a great many times within
however, sexual power and desire become
torrhœa is frequently complained of. 4. Di
urine in some cases, the patient being obliged t
instantly ; or, on the other hand, retention and

When the disease is fully declared, the sym
istic, and chiefly point to a loss of the powe
muscles of the legs, and of the muscular sense.
that he is losing control over the movements
cannot walk steadily or firmly without support, b
uncertain gait. This is particularly noticed in
finds that he has to pay special attention to the
extremities, in order to carry them on properly.
of impaired co-ordination are very evident whe
walk. He is very unsteady in his movement
advance precipitately ; and during progression
unnecessary height, then throws it forwards a
down the heel with a heavy stamp. On turni
or falls, and the same thing happens if he shut
There is no paralysis, as is proved by the fa
easily moved in all directions in the lying p
becomes impossible, the legs being thrown hit
any appearance of design or control when any
made. The muscles do not waste. The cond
lity is doubtful, some affirming that it become
that it remains normal ; in the early stage it is o

In some cases the ataxic condition spreads to the arms, head and
eck, and trunk. Not uncommonly ptosis of one eyelid is observed,
nd there may be more or less complete amaurosis, with atrophy of the
isc. These conditions result from extension of the disease upwards,
o as to involve the origin of the respective nerves. Now and then
ere is mental disturbance. Ultimately the entire cord may become
plicated, so that actual paralysis of the lower part of the body arises,
well as of the rectum and bladder.

Chapter LXXXV.

GENERAL DIAGNOSIS, PROGNOSIS, AND TREATMENT OF ORGANIC NERVOUS DISEASES.

will be most convenient to treat this subject as a whole, and to divide
cases into certain groups such as they are ordinarily presented in
ctice.

I. Diagnosis.

1. The first matter to be determined in any case of organic nervous
ease is whether the lesion is *cerebral*, *spinal*, or *peripheral*. The
eral clinical characters of cerebral and spinal diseases respectively
e already been pointed out, and they can usually be readily distin-
shed from each other if attention is paid to these. It must be re-
mbered that the brain and cord may be involved at the same time.
ipheral disease is generally easily recognised by the localisation of
symptoms, and the existence of some obvious cause to which they
traceable Local nervous phenomena may, however, be the result of
ited or commencing central disease. The use of electricity affords
h aid in recognising the seat of lesion when there is paralysis, as
been explained in a former chapter.

. The diagnosis of affections of the brain and its membranes will
be considered.

.) *Acute inflammatory diseases.*—*a.* These have to be distinguished
various extrinsic diseases attended with severe nervous symptoms,
this particularly applies to tubercular meningitis occurring in
dren. The principal affections of this class with which they may be
ounded are the exanthemata, especially typhoid and typhus fever;
monia and other acute inflammatory affections; disorder of the
entary canal in children, particularly if acute and attended with
r and marked cerebral disturbance; anomalous cases of fever with
symptoms; great exhaustion of the vital powers, especially as the
lt of bad feeding, prolonged diarrhœa, or some lowering illness;
various derangements giving rise to reflex convulsions or delirium.
history of the case, as revealing some cause of cerebral inflamma-
or of one of the other complaints mentioned above; the age, con-
tional condition, and hereditary tendencies of the patient; the

judicious treatment, and the obscurity will in mos
be cleared up. *b.* Inflammatory diseases have
other affections of the nervous system, which giv
bral excitement. Acute meningitis in an adult
active congestion, in which, however, the sympto
and usually slight, with little or no fever; delir
mania. In the last two conditions there is ra
proper attention be paid to the previous histo
present. In mania the existence of one or mo
absence of fever or of signs of vascular exciteme
important in diagnosis. In doubtful cases the
modic and paralytic phenomena or of coma us
existence of meningitis. Meningeal hæmorrhag
have in rare instances been mistaken for tuber
symptoms of acute inflammatory softening and
often closely resemble each other, and occasionall
simulates cerebritis at first. *c.* The diagnosis of
britis and its consequences, and of simple from
calls for a few remarks. Meningitis and cerebri
or less combined, but the latter is distinguished m
of cerebral excitement being much less marked
or even absent altogether; while those indicative
bral functions rapidly supervene; there is also m
excitement and general pyrexia. The chief ci
tubercular is distinguished from simple meningi
patient in many cases; the presence of signs of t
or a history of hereditary taint, and absence of a
of meningitis; the more marked and prolonged p
with insidious mode of onset; the evidences of
the base chiefly at first, there being less psychic

each of these conditions have been already described, and need not be recapitulated here. The ordinary causes acting directly on the nervous system which are to be borne in mind as likely to account for unconsciousness, the origin of which is not evident, are :—*a.* Injury to the head. *b.* Epileptic or other form of convulsive seizure. *c.* Uræmia. *d.* Poisoning by alcohol or opium. *e.* Sun-stroke. *f.* Certain organic affections of the brain or its membranes, viz., cerebral congestion ; hæmorrhage into the brain or meninges ; embolism or thrombosis ; and rapid serous effusion.

In endeavouring to arrive at a diagnosis, the following course of investigation should be pursued :—

1. Inquiry must first be made as to the mode of attack, and if there is any known cause for this. Thus there may be a history of injury, opium-poisoning, or alcoholism. On the other hand, the circumstances under which the seizure occurs may exclude such causes altogether, but it is important to bear in mind that symptoms of opium-poisoning may not appear until some time after the poison has been taken. Not uncommonly, however, the patient is found in a state of insensibility, and no history can be obtained. Should this happen in a house, it is requisite in any suspicious case to look for bottles which might have contained poison. If the attack has come on under observation, it is very important to ascertain whether it arose spontaneously or followed some obvious cause, as sudden effort or a fit of anger ; whether it was sudden in its onset or more or less gradual ; if preceded or not by mental disturbance, local sensory or motor disorder, or other symptoms ; and if any convulsive movements were observed at or soon after the beginning of the attack. This information affords much aid in distinguishing organic lesions from each other ; while the occurrence of convulsions entirely excludes poisoning. The age of the patient should be ascertained, if it is known.

2. In the next place careful examination of the patient must be made, noting especially the following particulars :—*a.* The apparent age ; general conformation and appearance, whether full and plethoric or the reverse, and if there are marked signs of decay. *b.* The colour of the face, whether indicating congestion or shock. *c.* If any signs of injury about the head can be discovered. *d.* Whether there are any indications that the attack began with convulsions, such as the tongue having been bitten. *e.* The odour of the breath, which may reveal alcohol, opium, or uræmia. *f.* The degree of insensibility, deep coma usually indicating hæmorrhage or poisoning. *g.* The state of the pupils, any inequality showing some erebral organic lesion ; while extreme contraction is a sign of opium-poisoning, though the same condition is now and then observed in cerebral hæmorrhage, while the pupils are greatly dilated at the close in ases of opium-poisoning. *h.* If there are any indications of unilateral motor disorder, looking especially for paralysis ; turning of the head and yes to one side ; tremors ; spasmodic movements or rigidity. These fford evidence of some cerebral lesion, though their absence does not xclude this, while marked spasm or rigidity is in favour of plugging of essels or meningeal hæmorrhage. *i.* The characters of the breathing, low, laboured, and stertorous respiration being usually only observed in the profound coma of cerebral hæmorrhage or narcotic poisoning.

j. The state of the pulse. It is highly important further to examine th heart and vessels. Valvular disease or some other condition likely t give rise to embolism may be thus discovered; cardiac enlargement i often associated with cerebral congestion or hæmorrhage; in cases c thrombosis the heart is usually very weak or fatty: markedly degenerat vessels may accompany either hæmorrhage or thrombosis. The urin should also be tested, and some may be removed by the catheter necessary. Bright's disease, however, may be associated with uræmi cerebral hæmorrhage, or thrombosis. The detection of alcohol in th urine has been considered useful in the diagnosis of alcoholic poisonin If the patient vomits, the matters vomited ought to be examined in an doubtful case, and it may even be desirable to use the stomach-pump.

3. The progress and issue of an apoplectic case often give muc information as to its nature. Thus opium-poisoning and hæmorrhag on a very extensive scale or into certain parts of the brain soon term nate fatally. In a considerable experience of cases of alcoholic poiso ing at the Liverpool Northern Hospital, I never knew one termina fatally, even when the coma was very deep. The course of even affords important help in distinguishing between cerebral congestio hæmorrhage; and plugging of vessels.

There are some points of practical importance which demand notic The greatest care should be taken not to pronounce a person mere drunk in whom there are signs of this condition, as there may be at t same time some serious injury to the head, or organic lesion in t brain. Grave mistakes have not infrequently been made in this matt Alcoholic poisoning may be met with in very young children, even infants in arms. It is sometimes difficult or impossible to determi whether comatose symptoms are due to some evident injury to t head; or to a sudden cerebral lesion which has caused the patient fall, and has thus led to the injury.

(iii.) Another group of cerebral cases is characterised by sudden rapidly-developed hemiplegia without loss of consciousness. This in cates either hæmorrhage into the brain; or plugging of vessels, especi from thrombosis. The probability is always in favour of the latter, a the diagnosis is still more certain if the paralysis is not suddenly co plete, but increases and extends in a progressive manner.

(iv.) *Chronic organic affections of the brain and meninges.*—Not unc monly head-symptoms are complained of more or less constantly, s as headache or giddiness, and it becomes a question whether th depend upon some extrinsic disturbance, especially connected with digestive organs, heart, or kidneys; or upon some morbid conditior the brain, such as congestion or disease of the vessels. It is alw well to give a cautious opinion under these circumstances. The gen condition of the patient; presence or absence of marked symptoms ferable to the alimentary canal; state of the heart, vessels, and kidne and the precise nature of the symptoms complained of will usually ren the diagnosis apparent. Any sensory or motor disorder in the br especially if always noticed on one side or fixed in the same spot, sho be looked upon with suspicion.

The principal chronic cerebral diseases between which a diagn has to be usually made are *chronic meningitis; chronic softening,* a *mour.* It must be remembered that these are often associated, when eir symptoms are more or less combined. The chief points to be nsidered in the diagnosis are :—1. The history of the case, as reveal-ʒ some local cause of meningitis or a syphilitic taint; or the absence any such cause. 2. The age and general condition of the patient, th the state of the main organs and vessels, softening being generally companied with signs of marked degeneration, and occurring in old rsons or in those prematurely aged. There may be signs of some con-tutional taint associated with tumour; or of morbid deposits in other rts, especially cancerous, tubercular, or syphilitic. 3. The seat, inten-y, and characters of headache. 4. The mental condition, meningitis ing chiefly characterised by excitement alternating with depression; tening by gradual and permanent impairment of the mental faculties; ile in cases of tumour the mind is often quite natural. 5. The cha-cter and mode of distribution of sensory and motor disturbances. ese have been pointed out in the description of the symptoms of ch disease, and they are very important. 6. The appearances re-aled by the ophthalmoscope. Occasionally there are external objective ns of tumour. As to the nature of a growth in the brain, it is often possible to come to any certain conclusion. Some indications may derived from the age of the patient; a history of syphilis; signs of a rticular cachexia; or the presence of morbid growths in other parts.

Epileptiform seizures may occur in the course of the diseases just nsidered. These can generally be distinguished from true epileptic fits their irregular character; and by the existence of definite symptoms dicative of one or other of these morbid states.

The difference between *chronic hydrocephalus* and *hypertrophy of the ain* in children, each of which causes enlargement of the head, have en sufficiently pointed out in their several descriptions.

(v.) The determination of the exact seat of any organic lesion in con-ction with the brain or its membranes is often very difficult, requiring reful consideration of all the clinical phenomena observed. The hthalmoscope often affords much aid; and Dr. Gowers has drawn particular attention to the necessity of testing the field of vision in ler to localize a cerebral lesion. For instance, partial double hemi-ia is often present when unsuspected by the patient. This shows ease of the optic fibres on the side opposite to the hemiopia behind commissure; or of their terminations in the central ganglia, corpora iiculata, or optic thalamus. Hence when other nervous symptoms bilateral, this hemiopia may afford the only indication as to the e which is affected, and it may be the means of still further localizing mischief to that part of the hemisphere which is contiguous to the ic tract and ganglia. If the lesion is situated in the commissure itself, ch is very rare, the loss of vision is not on the same side in both eyes, the two outer or two inner fields are lost.

. *Diseases of the spinal cord and its membranes.*—The diagnosis of ial affections needs but brief notice. Acute spinal meningitis may be taken for tetanus; spinal congestion; or spinal irritation; but there arely any difficulty in separating them. Myelitis is distinguished n meningitis by the absence of symptoms of irritation; with rapid elopment of signs of destruction of the cord and failure of its func-

In some cases the ataxic condition spreads to the arms, head and neck, and trunk. Not uncommonly ptosis of one eyelid is observed, and there may be more or less complete amaurosis, with atrophy of the disc. These conditions result from extension of the disease upwards, so as to involve the origin of the respective nerves. Now and then there is mental disturbance. Ultimately the entire cord may become implicated, so that actual paralysis of the lower part of the body arises, as well as of the rectum and bladder.

CHAPTER LXXXV.

GENERAL DIAGNOSIS, PROGNOSIS, AND TREATMENT OF ORGANIC NERVOUS DISEASES.

IT will be most convenient to treat this subject as a whole, and to divide the cases into certain groups such as they are ordinarily presented in practice.

I. DIAGNOSIS.

1. The first matter to be determined in any case of organic nervous disease is whether the lesion is *cerebral*, *spinal*, or *peripheral*. The general clinical characters of cerebral and spinal diseases respectively have already been pointed out, and they can usually be readily distinguished from each other if attention is paid to these. It must be remembered that the brain and cord may be involved at the same time. Peripheral disease is generally easily recognised by the localisation of he symptoms, and the existence of some obvious cause to which they are traceable Local nervous phenomena may, however, be the result of imited or commencing central disease. The use of electricity affords much aid in recognising the seat of lesion when there is paralysis, as has been explained in a former chapter.

2. The diagnosis of affections of the brain and its membranes will next be considered.

(i.) *Acute inflammatory diseases.*—*a.* These have to be distinguished from various extrinsic diseases attended with severe nervous symptoms, and this particularly applies to tubercular meningitis occurring in children. The principal affections of this class with which they may be confounded are the exanthemata, especially typhoid and typhus fever; pneumonia and other acute inflammatory affections; disorder of the alimentary canal in children, particularly if acute and attended with fever and marked cerebral disturbance; anomalous cases of fever with brain symptoms; great exhaustion of the vital powers, especially as the result of bad feeding, prolonged diarrhœa, or some lowering illness; and various derangements giving rise to reflex convulsions or delirium. The history of the case, as revealing some cause of cerebral inflammaion or of one of the other complaints mentioned above; the age, constitutional condition, and hereditary tendencies of the patient; the mode of onset of the attack; careful examination regarding the symptoms, particularly as to the degree and character of those referable to the head, and the presence or absence of indications of cerebral lesion in the way of motor or sensory disorder, the intensity and course of pyrexia, the symptoms connected with the alimentary canal, and those characteristic of the various fevers; physical examination of the different organs; and the course and progress of the case are the chief matters to be relied on in diagnosis. It is frequently impossible in children to determine at first whether they are suffering from tubercular meningitis or from one of the complaints above enumerated. Under such circumstances the only thing to be done is to watch the case carefully and observe its progress, at the same time employing some judicious treatment, and the obscurity will in most instances before long be cleared up. *b.* Inflammatory diseases have to be separated from other affections of the nervous system, which give rise to signs of cerebral excitement. Acute meningitis in an adult may be simulated by active congestion, in which, however, the symptoms are but temporary and usually slight, with little or no fever; delirium tremens; or acute mania. In the last two conditions there is rarely much difficulty, if proper attention be paid to the previous history and the symptoms present. In mania the existence of one or more fixed delusions, and absence of fever or of signs of vascular excitement about the head, are important in diagnosis. In doubtful cases the supervention of spasmodic and paralytic phenomena or of coma usually soon reveals the existence of meningitis. Meningeal hæmorrhage and cerebral tumour have in rare instances been mistaken for tubercular meningitis. The symptoms of acute inflammatory softening and that due to thrombosis often closely resemble each other, and occasionally cerebral hæmorrhage simulates cerebritis at first. *c.* The diagnosis of meningitis from cerebritis and its consequences, and of simple from tubercular meningitis, calls for a few remarks. Meningitis and cerebritis are frequently more or less combined, but the latter is distinguished mainly by the symptoms of cerebral excitement being much less marked and of short duration, or even absent altogether; while those indicative of failure of the cerebral functions rapidly supervene; there is also much less local vascular excitement and general pyrexia. The chief circumstances by which tubercular is distinguished from simple meningitis are the age of the patient in many cases; the presence of signs of the tubercular diathesis or a history of hereditary taint, and absence of any other obvious cause of meningitis; the more marked and prolonged premonitory symptoms, with insidious mode of onset; the evidences of inflammation affecting the base chiefly at first, there being less psychical disturbance and no wild delirium; the headache being more in severe paroxysms; the minor degree of fever or local vascular excitement; the special characters of the pulse; and the less rapid course.

(ii.) *Apoplectic diseases.*—These constitute a most important class of cases. The comatose condition may either be developed more or less suddenly while the patient is under observation; or he may be found in an unconscious state. The first thing to be determined in a case of insensibility of which the cause is unknown is whether this is due to syncope or shock; asphyxia; or coma. The characteristic features of each of these conditions have been already described, and need not be recapitulated here. The ordinary causes acting directly on the nervous system which are to be borne in mind as likely to account for unconsciousness, the origin of which is not evident, are :—*a.* Injury to the head. *b.* Epileptic or other form of convulsive seizure. *c.* Uræmia. *d.* Poisoning by alcohol or opium. *e.* Sun-stroke. *f.* Certain organic affections of the brain or its membranes, viz., cerebral congestion; hæmorrhage into the brain or meninges; embolism or thrombosis; and rapid serous effusion.

In endeavouring to arrive at a diagnosis, the following course of investigation should be pursued :—

1. Inquiry must first be made as to the mode of attack, and if there is any known cause for this. Thus there may be a history of injury, opium-poisoning, or alcoholism. On the other hand, the circumstances under which the seizure occurs may exclude such causes altogether, but it is important to bear in mind that symptoms of opium-poisoning may not appear until some time after the poison has been taken. Not uncommonly, however, the patient is found in a state of insensibility, and no history can be obtained. Should this happen in a house, it is requisite in any suspicious case to look for bottles which might have contained poison. If the attack has come on under observation, it is very important to ascertain whether it arose spontaneously or followed some obvious cause, as sudden effort or a fit of anger; whether it was sudden in its onset or more or less gradual; if preceded or not by mental disturbance, local sensory or motor disorder, or other symptoms; and if any convulsive movements were observed at or soon after the beginning of the attack. This information affords much aid in distinguishing organic lesions from each other; while the occurrence of convulsions entirely excludes poisoning. The age of the patient should be ascertained, if it is known.

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Embolism or thrombosis is not so frequently immediately fatal as hæmorrhage, but the subsequent history is generally very unfavourable, both as regards the mental condition and the paralysis, especially in cases of thrombosis accompanied with extensive disease of the vessels, these often going on rapidly from bad to worse.

3. In chronic brain-affections the prognosis is very uncertain. All that can be said is that any such affection is always serious; and that at any moment dangerous symptoms are liable to arise, which may end in speedy death. If the disease is due to syphilis, however, much improvement may often be effected by proper treatment. If there are indications of frequent or constant disorder of the cerebral circulation, along with degeneration of the vessels, the danger of the supervention of hæmorrhage or thrombosis should be recognised.

4. Acute inflammation of the cord or its membranes is very grave, and often proves rapidly fatal, but myelitis may remain as a chronic affection. Once the cord is destroyed by any acute or chronic lesion, permanent paralysis is established in the parts below the seat of mischief, but cases of this kind frequently linger on a long while, and the patients may be in a condition of good general health. Bed-sores, cystitis, and other untoward complications are, however, very liable to arise. Symptoms due to syphilitic disease of the cord improve remarkably in many cases under appropriate treatment. Locomotor ataxy is not usually amenable to treatment when fully established, but in recent cases much good may be done. Its progress is very slow.

III. Treatment.

1. *Acute meningitis and cerebritis.*—Unfortunately direct treatment is of very little service in these diseases, and my own experience of a good number of cases at the Liverpool Northern Hospital is decidedly opposed to the measures usually recommended by some high authorities, viz., bleeding; severe purging; mercurialization; and extensive blistering. The measures which are most likely to be useful in the early stage are to place the patient in a well-ventilated, cool, quiet, and somewhat darkened room, on a comfortable bed, with the head high; to enjoin perfect freedom from every kind of disturbance; to cut the hair very short or even shave the head, and apply cold assiduously but cautiously by means of the ice-bag or irrigation; to open the bowels tolerably freely, a dose of calomel or croton-oil being useful for this purpose, as well as enemata; to limit the diet to beef-tea and milk; and if there are signs of vascular excitement, to apply a few leeches over the emples. Convulsions are best treated by bromide of potassium in ull doses, especially in cases of tubercular meningitis. Opium must e avoided. In the later stages a blister may be applied to the nape of he neck, or a couple behind the ears, but the advantage of blistering he whole scalp, as has been advocated, seems to me very questionable. hould symptoms of adynamia set in, stimulants are needed, especially randy, ammonia, and ether, with abundant liquid nourishment, and if e patient is unconscious, they may be injected between the teeth by eans of a syringe, or administered by enemata. Care must be taken roughout to keep the feet warm; to attend to thorough cleanliness; d to see that the bladder is properly emptied. Sinapisms and flying

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mptoms may arise calling for active interference. For chronic hydro- phalus diuretics are recommended, with the view of aiding absorption the fluid. Pressure around the head by means of a bandage or apping; and removal of the fluid by a fine trochar or the aspirateur ve also been employed.

4. *Spinal diseases.*—In acute inflammations affecting the spinal cord, patient should be kept at rest, lying on the side or in a somewhat ne position. Ice may be applied constantly along the spine. In ne cases the application of leeches over this region is useful. Medi- es are of doubtful value. Dr. Radcliffe recommends iodide of tassium with opium in spinal meningitis. When the cord is involved, ladonna, conium, and ergot are believed to exercise a direct beneficial ct upon it. It is particularly important to attend to the bladder and wels in cases of disease of the cord; to see that the patient is kept an and dry; and to guard against bed-sores, for which object a water- l is very valuable. This applies more particularly to chronic affections, which all that can be done further is to support the general health by d food, proper hygienic conditions, and tonics, especially quinine, iron, l preparations of phosphorus; to promote absorption of morbid pro- ts, particularly syphilitic deposits, by the aid of iodide of potassium l bichloride of mercury; to stimulate the functions of the cord by nute doses of strychnia; and to treat the paralysis. Cases of loco- tor ataxy have been benefited by electricity and large doses of iodide potassium; at the same time making use of means for improving the eral health.

CHAPTER LXXXVI.

ON CERTAIN SPECIAL NERVOUS DISEASES.

I. PROGRESSIVE MUSCULAR ATROPHY—WASTING PALSY—CRUVEILHIER'S PARALYSIS.

IOLOGY AND PATHOLOGY.—Wasting palsy has been attributed path- gically to an atrophic and degenerative change beginning in the olved muscles themselves; in the anterior roots of the nerves supply- them; or in the spinal cord, but there is no certainty with regard to matter. The chief supposed *exciting causes* are exposure to cold and ; a blow or fall on the neck or back; and excessive use, with conse- nt fatigue of muscles. The disease occurs by far most commonly in les, and usually in persons about 30 years of age, though it may be t with from childhood to old age. In some cases it appears to be editary, or to affect several members of the same family.

NATOMICAL CHARACTERS.—The affected muscles are wasted more ess, pale and yellowish, soft, the muscular fibres being replaced by a nular, fatty, gelatinous tissue, through which the tendons pass. The scles are altered to a very variable degree, and one may be found quite e while that next it is unchanged, or healthy bundles of muscular ue may be seen in the midst of the morbid material. The upper por-

Embolism or thrombosis is not so frequently immediately fatal as hæmorrhage, but the subsequent history is generally very unfavourable, both as regards the mental condition and the paralysis, especially in cases of thrombosis accompanied with extensive disease of the vessels, these often going on rapidly from bad to worse.

3. In chronic brain-affections the prognosis is very uncertain. All that can be said is that any such affection is always serious; and that at any moment dangerous symptoms are liable to arise, which may end in speedy death. If the disease is due to syphilis, however, much improvement may often be effected by proper treatment. If there are indications of frequent or constant disorder of the cerebral circulation, along with degeneration of the vessels, the danger of the supervention of hæmorrhage or thrombosis should be recognised.

4. Acute inflammation of the cord or its membranes is very grave, and often proves rapidly fatal, but myelitis may remain as a chronic affection. Once the cord is destroyed by any acute or chronic lesion, permanent paralysis is established in the parts below the seat of mischief, but cases of this kind frequently linger on a long while, and the patients may be in a condition of good general health. Bed-sores, cystitis, and other untoward complications are, however, very liable to arise. Symptoms due to syphilitic disease of the cord improve remarkably in many cases under appropriate treatment. Locomotor ataxy is not usually amenable to treatment when fully established, but in recent cases much good may be done. Its progress is very slow.

III. TREATMENT.

1. *Acute meningitis and cerebritis.*—Unfortunately direct treatment is of very little service in these diseases, and my own experience of a good number of cases at the Liverpool Northern Hospital is decidedly opposed to the measures usually recommended by some high authorities, viz., bleeding; severe purging; mercurialization; and extensive blistering. The measures which are most likely to be useful in the early stage are to place the patient in a well-ventilated, cool, quiet, and somewhat darkened room, on a comfortable bed, with the head high; to enjoin perfect freedom from every kind of disturbance; to cut the hair very short or even shave the head, and apply cold assiduously but cautiously by means of the ice-bag or irrigation; to open the bowels tolerably freely, a dose of calomel or croton-oil being useful for this purpose, as well as enemata; to limit the diet to beef-tea and milk; and if there are signs of vascular excitement, to apply a few leeches over the temples. Convulsions are best treated by bromide of potassium in full doses, especially in cases of tubercular meningitis. Opium must be avoided. In the later stages a blister may be applied to the nape of the neck, or a couple behind the ears, but the advantage of blistering the whole scalp, as has been advocated, seems to me very questionable. Should symptoms of adynamia set in, stimulants are needed, especially brandy, ammonia, and ether, with abundant liquid nourishment, and if the patient is unconscious, they may be injected between the teeth by means of a syringe, or administered by enemata. Care must be taken throughout to keep the feet warm; to attend to thorough cleanliness; and to see that the bladder is properly emptied. Sinapisms and flying

nay be employed; passive motion; and electricity. The continuous nd interrupted currents are both serviceable, and their persevering use roves often very beneficial. According to Duchenne, "the more a nuscle is atrophied and its contractility diminished, the longer it should e subjected to the stimulation, the more intense should be the current, nd the more rapid its intermissions. When the sensibility is seen to turn, it is prudent to diminish the intermissions and abate the inten-ty of the current." Pain may be subdued by warm fomentations or aths, or, if it is severe, by the hypodermic injection of morphia.

II. Essential Paralysis of Children—Infantile Paralysis.

Etiology.—The causation of infantile paralysis is but little under-ood. The complaint occurs in the large majority of cases between months and 3 or 4 years of age, but may be met with in patients om 2 months to 8 years old. Sex and constitutional condition ive no influence. It sometimes follows one of the acute exanthemata, it has also been attributed to painful dentition; injury to the back; ld from lying on damp ground; and digestive derangements.

Anatomical Characters.—After the disease has lasted for some me, the affected muscles are not only atrophied, but also present signs f fatty degeneration. Infantile paralysis seems to be the result of some sion in connection with the spinal cord, but it is by no means clear hat this lesion is. Many have denied that there is any special alte-ation, while others have described spinal congestion, or even hæmor-hage into the cord. In prolonged cases the antero-lateral columns and nterior roots of the nerves have been found to be the seat of atrophy nd distortion for a variable extent, the nerve-cells having disappeared, nd the neuroglia become hypertrophied.

Symptoms.—The invasion of infantile paralysis is usually indicated y some premonitory symptoms, especially pyrexia, generally not very narked and exhibiting remissions, which lasts from 24 to 48 hours; some-imes by convulsions, not involving the face, and unattended with cere-ral symptoms. In exceptional cases mental excitement, delirium, or ss of consciousness is noticed at the outset, or the paralysis may set in uddenly without any warning. At first the paralysis is often more or ss general, affecting both sides, but usually the lower limbs more than e upper, so that the child lies quite helpless; in other instances it is mited to one or more of the limbs. The implicated muscles are re-xed. Sensation is not perceptibly affected as a rule, but elder children ay complain of pains in the limbs and back, and there may be some mbness, which, however, soon disappears. The sphincters are not volved. Reflex excitability is impaired or abolished, but electric irri-bility seems to be retained. In rare instances the paralysis dis-pears entirely in a few days, and the patient is completely restored. e ordinary course of events is for some of the limbs or muscles to cover in from two or three days to a fortnight, while others remain rmanently paralysed. This permanent paralysis is generally of para-gic distribution, though one leg is more affected than the other; exceptional cases it is hemiplegic, or a leg and an arm may be impli-ted on opposite sides, or the paralysis may be confined to one limb, ymptoms may arise calling for active interference. For chronic hydro-ephalus diuretics are recommended, with the view of aiding absorption f the fluid. Pressure around the head by means of a bandage or trapping; and removal of the fluid by a fine trochar or the aspirateur ave also been employed.

4. *Spinal diseases.*—In acute inflammations affecting the spinal cord, e patient should be kept at rest, lying on the side or in a somewhat one position. Ice may be applied constantly along the spine. In me cases the application of leeches over this region is useful. Medi-nes are of doubtful value. Dr. Radcliffe recommends iodide of tassium with opium in spinal meningitis. When the cord is involved, lladonna, conium, and ergot are believed to exercise a direct beneficial ect upon it. It is particularly important to attend to the bladder and wels in cases of disease of the cord; to see that the patient is kept an and dry; and to guard against bed-sores, for which object a water-d is very valuable. This applies more particularly to chronic affections, which all that can be done further is to support the general health by od food, proper hygienic conditions, and tonics, especially quinine, iron, d preparations of phosphorus; to promote absorption of morbid pro-cts, particularly syphilitic deposits, by the aid of iodide of potassium d bichloride of mercury; to stimulate the functions of the cord by nute doses of strychnia; and to treat the paralysis. Cases of loco-otor ataxy have been benefited by electricity and large doses of iodide potassium; at the same time making use of means for improving the neral health.

CHAPTER LXXXVI.

ON CERTAIN SPECIAL NERVOUS DISEASES.

I. PROGRESSIVE MUSCULAR ATROPHY—WASTING PALSY—CRUVEILHIER'S PARALYSIS.

TIOLOGY AND PATHOLOGY.—Wasting palsy has been attributed path-ogically to an atrophic and degenerative change beginning in the volved muscles themselves; in the anterior roots of the nerves supply-g them; or in the spinal cord, but there is no certainty with regard to s matter. The chief supposed *exciting causes* are exposure to cold and t; a blow or fall on the neck or back; and excessive use, with conse-ent fatigue of muscles. The disease occurs by far most commonly in les, and usually in persons about 30 years of age, though it may be t with from childhood to old age. In some cases it appears to be reditary, or to affect several members of the same family.

ANATOMICAL CHARACTERS.—The affected muscles are wasted more less, pale and yellowish, soft, the muscular fibres being replaced by a nular, fatty, gelatinous tissue, through which the tendons pass. The iscles are altered to a very variable degree, and one may be found quite ne while that next it is unchanged, or healthy bundles of muscular sue may be seen in the midst of the morbid material. The upper portions of the muscles are usually most changed. The anterior roots of some spinal nerves and the sympathetic branches joining them have been found atrophied, the nerve-elements being replaced by a finely-granular tissue. Similar changes have also been noticed in the posterior columns of the cord and posterior cornua of the grey matter, along with thickening and granular degeneration of the vessels, though the cord may appear healthy to the naked eye.

SYMPTOMS.—Wasting palsy sets in very insidiously. It usually begins in either shoulder or hand, especially in the right deltoid, but gradually advances from its starting point so as to invade other muscles, until finally every voluntary muscle in the body may be involved, except those of the eyeballs and eyelids, and the muscles of mastication. Occasionally the muscles of the neck are first implicated, and rarely those of the face. There is loss of power, corresponding in situation, extent, and degree to the wasting, and this may culminate in absolute helplessness, with inability to swallow, speak, or breathe, death then resulting from asphyxia. At the same time there are marked objective signs of the atrophy of the muscles, which are well seen about the shoulders and in the hands, the latter assuming the "claw-hand" shape, characterised by deep depressions due to the wasting of the muscles, while the tendons stand out and the fingers are drawn in towards the palm, being also pushed back; the ball of the thumb is much wasted; the shoulder is flattened or depressed, and the bony prominences seem to stand out. The tissues have a soft, flabby feel. The face assumes a vacant, idiotic expression when its muscles become affected. During the progress of wasting the muscles present constant flickering movements so long as any muscular tissue is left, which are more marked if the skin is exposed to cold or blown upon. The irritability and force of contraction under electricity become diminished in proportion to the waste of tissue. The mind is unaffected to the last. Pain may or may not be complained of in the affected parts. There is never any loss of power over the bladder or rectum, and the heart is never implicated. In some cases the disease does not spread to the extent above described, but is arrested in its progress, the patient ultimately recovering, especially when it is due to fatigue of special muscles.

DIAGNOSIS.—The conditions which are liable to be mistaken for progressive muscular atrophy are paralysis from local injury or disease of a nerve; chronic lead-poisoning; essential paralysis; and general paralysis of the insane. Attention to the history, symptoms, and mode of progress of the complaint will generally make the diagnosis evident.

PROGNOSIS.—Improvement can often be effected by early treatment. but in advanced cases very little can be done, especially if the disease is extensive and rapid in its progress. The prognosis is more favourable when the complaint is due to fatigue; while it is worse if any hereditary tendency is evident.

TREATMENT.—If wasting palsy has arisen from excessive use of certain muscles, these must be allowed to rest. Improvement of the general health is highly important, by means of nutritive diet, tonics, change of air, and gentle regular exercise. Warm or sulphur-baths have been recommended, but cold baths should not be used. The chief local methods of treatment are systematic friction, for which some simple liniment nay be employed; passive motion; and electricity. The continuous und interrupted currents are both serviceable, and their persevering use roves often very beneficial. According to Duchenne, "the more a nuscle is atrophied and its contractility diminished, the longer it should e subjected to the stimulation, the more intense should be the current, nd the more rapid its intermissions. When the sensibility is seen to eturn, it is prudent to diminish the intermissions and abate the intenity of the current." Pain may be subdued by warm fomentations or aths, or, if it is severe, by the hypodermic injection of morphia.

II. Essential Paralysis of Children—Infantile Paralysis.

Etiology.—The causation of infantile paralysis is but little underood. The complaint occurs in the large majority of cases between months and 3 or 4 years of age, but may be met with in patients om 2 months to 8 years old. Sex and constitutional condition ave no influence. It sometimes follows one of the acute exanthemata, ut has also been attributed to painful dentition; injury to the back; old from lying on damp ground; and digestive derangements.

Anatomical Characters.—After the disease has lasted for some ime, the affected muscles are not only atrophied, but also present signs f fatty degeneration. Infantile paralysis seems to be the result of some esion in connection with the spinal cord, but it is by no means clear hat this lesion is. Many have denied that there is any special alteration, while others have described spinal congestion, or even hæmorrhage into the cord. In prolonged cases the antero-lateral columns and anterior roots of the nerves have been found to be the seat of atrophy and distortion for a variable extent, the nerve-cells having disappeared, and the neuroglia become hypertrophied.

Symptoms.—The invasion of infantile paralysis is usually indicated by some premonitory symptoms, especially pyrexia, generally not very marked and exhibiting remissions, which lasts from 24 to 48 hours; someimes by convulsions, not involving the face, and unattended with cerebral symptoms. In exceptional cases mental excitement, delirium, or oss of consciousness is noticed at the outset, or the paralysis may set in uddenly without any warning. At first the paralysis is often more or ess general, affecting both sides, but usually the lower limbs more than he upper, so that the child lies quite helpless; in other instances it is mited to one or more of the limbs. The implicated muscles are rexed. Sensation is not perceptibly affected as a rule, but elder children ay complain of pains in the limbs and back, and there may be some umbness, which, however, soon disappears. The sphincters are not volved. Reflex excitability is impaired or abolished, but electric irribility seems to be retained. In rare instances the paralysis disppears entirely in a few days, and the patient is completely restored. he ordinary course of events is for some of the limbs or muscles to cover in from two or three days to a fortnight, while others remain rmanently paralysed. This permanent paralysis is generally of paraegic distribution, though one leg is more affected than the other; exceptional cases it is hemiplegic, or a leg and an arm may be implited on opposite sides, or the paralysis may be confined to one limb, or a part of it. Subsequently the paralysed parts become atrophied and stunted in their growth; electric irritability is entirely lost; all their tissues undergo degeneration; the pulse becomes small and the circulation languid; the temperature falls considerably; and various deformities and distortions arise, according to the part involved, such as clubfoot, flexion of the hips, &c. Those who have been subjects of infantile paralysis often live to an advanced age, and many belong to the class of mendicant cripples.

Diagnosis.—Until the paralysis sets in there is nothing distinctive about this complaint, but at this time its symptoms are sufficiently characteristic. In very young infants it may be difficult to make out the paralysed condition. The diseases which might possibly be mistaken for infantile paralysis are meningeal hæmorrhage; paralysis following diphtheria; myelitis; and tumours or other morbid conditions of the brain.

Prognosis.—Caution is always necessary in giving an opinion on this point. Recovery is often brought about by appropriate treatment, if commenced early and persevered in. The prognosis is worse in proportion to the intensity of the initiatory fever; the loss of power; degree of wasting; and impairment of electric contractility. So long as electrocontractility remains improvement may be anticipated, but if this is quite extinguished a cure is impossible.

Treatment.—In the premonitory stage nothing need be done except to keep the patient in bed, and watch the progress of events. When the paralysis is evident, the important measures to be adopted are daily friction of the affected parts with olive oil or some stimulating liniment; passive movements, or, if the patient is old enough, active movements; and the persistent use of electricity. The continuous current of fair strength should be applied to the affected muscles for 10 or 15 minutes twice daily; and after a time a weak induced current may be employed. Gymnastics and mechanical appliances must be had recourse to in order to prevent or make up for deformities. Operations may also be required. The general health should be supported by nutritious diet, change of air, baths, cod-liver oil, iron, strychnine, and similar remedies.

III. Writer's Cramp—Scrivener's Palsy—Mogigraphia.

Etiology and Pathology.—The form of nervous disorder thus named is but one of a group in which sets of muscles habitually and frequently exercised for certain complicated actions become the seat of peculiar spasmodic movements. It occurs principally among those who write a great deal, such as teachers, merchants, and clerks, but similar derangements are met with in connection with other occupations, such as amongst violinists, pianoforte players, watch-makers, engravers, sempstresses, milkmaids, shoemakers, and nailsmiths. Overwork of the affected muscles seems to be an important element in the causation of the malady, and it is aggravated by mental worry and anxiety. Among writers the use of a steel-pen, the wearing of a tight coat-sleeve, and an inconvenient and constrained attitude have been considered as predisposing causes. Writer's cramp never occurs under 30 years of age, and is far more frequent among males than females.

)athology of writer's cramp is very doubtful, but the affection has ributed to a morbid condition or mal-nutrition of the nerve-centre ıg the implicated muscles, with consequent diminution in nerve- ır loss of co-ordinating power; to chronic fatigue of these ; to a reflex neurosis from muscular nerves; or to the transmis- 'oluntary impressions to other motor nerves besides those which ıded, sympathetic movements being thus excited.

roms.—The earliest symptom in most cases of writer's cramp, ıay be taken as a type of all similar diseases, is a sense of fatigue ing in the hand after writing, especially in the thumb, as well as the muscles of the upper extremity. The patient finds that : hold his pen more firmly, and give more mental attention to in order to write properly. This only aggravates the mischief, ', and in time control over the muscles concerned in the act ; diminished or lost, so that irregular spasmodic movements are in the fingers and thumb whenever any attempt at writing is The thumb may be convulsively flexed, the pen getting over kle; the index-finger is jerked; or the first three fingers exhibit ly spasmodic movements. Of course the writing is more or less and ultimately becomes mere illegible scribbling. The patient o alter his mode of writing, using the hand, wrist, elbow, and r in succession, but as he does so the corresponding muscles similar spasmodic movements. Then he takes to writing with hand, which becomes affected in the same manner.

;ymptoms just mentioned are intensified by mental excitement, ınxiety on the part of the patient to write properly. They cease ıtely the attempt to perform this act is given up, and all other can be carried on without any difficulty or disorder. In some dull pain is experienced in the muscles of the limb, or a feeling ıt and tightness; sensation, electric irritability, and nutrition are ay impaired. In exceptional cases headache, vertigo, mental occasional tremors, or other nervous symptoms are observed. ıeral health is usually good, but the patient is liable to be de- in spirits.

nosis.—There is but little difficulty in recognising the disease ler consideration, if attention is paid to the occupation of the and the peculiar course of symptoms above described. It ossibly be mistaken for wasting palsy, or the effects of chronic soning.

nosis.—If the condition has only existed for a short time, a cure expected under appropriate treatment; but in cases of long ı the prognosis is most unfavourable.

tment.—All attempts to check the progress of writer's cramp ; quill-pens, altering the mode of writing, employing douches :ion, and such measures are quite ineffectual, and an essential the treatment consists in absolute and prolonged rest from the ır employment which is the cause of the complaint, or, if pos- should be given up altogether. The regular use of the con- current has proved serviceable, applied to the muscles and nerves ırm, and along the spine. Dr. Poore employs it along with 'y movements of the muscles. When nothing can be done in the way of improvement, patients can sometimes manage to write by using some special apparatus.

IV. Pseudo-hypertrophic muscular paralysis. Duchenne's paralysis.

Etiology.—The *exciting causes* of this peculiar affection are quite obscure. Pathologically it has been attributed to some lesion of the motor and trophic nerve-cells in the cord, and has been considered to be the same disease as progressive muscular atrophy. It commences almost always during infancy or early childhood, and is by far most common in boys. In exceptional cases the disease begins in adults. Hereditary predisposition is supposed to exist occasionally.

Anatomical characters.—The obvious changes are associated with those voluntary muscles which are affected, these being increased in size and very firm, while they present important structural changes, the muscular fibres having to a great extent disappeared, many of those which remain being atrophied or in a state of degeneration, while the great mass of the apparently-enlarged muscles is made up of fat and fibrous tissue, the latter being partly the remains of the sheaths of the muscular fibres, partly the result of proliferation. In advanced cases other muscles are simply atrophied. Many observers have been unable to detect any morbid condition of the spinal cord, but extensive degeneration of the central grey matter and anterior commissure, as well as other changes, have been described by Lockhart Clarke and Gowers.

Symptoms.—Pseudo-hypertrophic muscular paralysis is a very chronic disease, and its progress has been divided into certain stages, the duration of which presents much variation. The muscles first affected are those of the legs and back, especially those of the calves, back of the thighs, and gluteal regions, and the erector spinæ. At the outset these are merely weak, which may be noticed when the child begins to walk. Subsequently they increase in size, and then the characteristic symptoms become evident. These are:—1. Enlargement and unnatural firmness of the calves, back of the thighs, and lumbar region. 2. Peculiarities in the attitude. When standing the patient is evidently unsteady, and keeps the legs wide apart, with the heels raised; the shoulders are thrown back and the antero-posterior curve of the spine is much exaggerated, so that the abdomen appears peculiarly prominent, but this prominence subsides in the sitting posture. 3. Peculiarities affecting the mode of progression and movements. In walking the legs are also much separated, the patient supports himself almost on tiptoe, and the body is balanced, first on one leg and then on the other, with a kind of waddling movement. The patient easily stumbles or falls, especially on attempting to walk rapidly, and soon becomes tired. Stooping is easily effected, but it is very difficult then to gain the erect posture, except when the patient is sitting down.

In course of time the muscles of the upper part of the trunk, of the arms, or even those of the face become involved. These may be also evidently enlarged, but more commonly wasting of the upper part of the body is observed, contrasting with the enlargement of the lower portion. The paralysis becomes more marked and extensive, and ultimately the

it lies in a completely helpless condition, at the same time the
rly hypertrophied muscles undergoing wasting. The mental facul-
nay become impaired, and headache, disorders of vision, and other
nces of cerebral disturbance may be noticed before the close.
results from gradual exhaustion; implication of the respiratory
les; or some intercurrent malady.

ry different statements have been made as to the electric contrac-
of the affected muscles. It is probably usually impaired to the
ed current, but has been found increased as regards the primary
nt. Portions of the diseased tissue may be removed for examina-
during life, by means of Duchenne's trochar.

AGNOSIS.—In a well-marked case there is no difficulty in recog-
this disease. It might possibly be mistaken for true muscular
rtrophy, or spinal disease.

OGNOSIS.—This is usually very unfavourable. Instances of recovery
e early stage have been reported, and improvement has been
ed in more advanced cases, but these are exceptions. Life may be
nged for many years.

EATMENT.—No drug has any direct influence upon Duchenne's
ysis. Tonics may be of some service. The only measures from
any benefit can be expected are shampooing and kneading; cold
hing; and the use of electricity. Local faradization of the affected
les is of much use, and the application of the primary current
the spine and sympathetic nerve has also been recommended.

V. Sclerosis of the Nerve-centres.

lerosis of the brain and spinal cord has attracted considerable atten-
of late years. This morbid condition may be variously distributed
gh these nerve-centres, and the clinical phenomena differ accord-
, but it appears more convenient in this work to offer a few general
rks on the subject. I have gathered my information principally
Dr. Hammond's treatise on Diseases of the Nervous System. The
varieties may be enumerated as:—1. Diffuse cerebral. 2. Multiple
ral. 3. Multiple cerebro-spinal. 4. Spinal. The last mentioned
een further sub-divided, as will be presently pointed out.

IOLOGY.—Age seems to have considerable influence as a predis-
g cause of the various forms of sclerosis, and in most cases they
nence respectively at the following periods of life:—Diffused cere-
during infancy; multiple cerebral from 50 to 60; cerebro-spinal
40 to 50; spinal from 35 to 45 or 50. Males suffer in much
r proportion than females. Hereditary predisposition is traceable
me cases, if not to the actual disease, to some other form of ner-
disorder. The *exciting causes* are very obscure, and in many cases
ot be made out in the least. The cerebral forms have been attri-
d in different instances to hæmorrhagic cysts; injury to the head;
fevers, especially typhoid and scarlatina; rheumatism or syphilis;
pation; severe emotional disturbance; excessive mental applica-
; great muscular exertion. The spinal varieties have been supposed
the result of previous inflammation of the cord or its membranes;
ies to the spine; straining, or the constant maintenance of a bent

position; sexual excess; exposure to cold; gout, scrofula, or syphilis; abuse of alcohol.

ANATOMICAL CHARACTERS.—Sclerosis consists essentially of hyperplasia of the neuroglia, with coincident atrophy and disappearance of the nerve-elements. The process is looked upon by many pathologists as being of an inflammatory nature. The affected part presents various degrees of increased firmness and density, being in many cases very hard and tough. At the same time it is condensed and contracted within its normal limits, as well as altered in colour, being white, greyish-white, or yellowish-grey. Microscopic examination reveals the elements of the neuroglia, with the *débris* of nerve-tissues.

The morbid condition is differently distributed in the various forms of the disease. In diffused cerebral sclerosis a large portion or the whole of a lobe is involved, or sometimes even the entire hemisphere, and the lesion is not circumscribed. It becomes less marked at its circumference and never invades the grey substance of the brain. Multiple cerebral sclerosis is characterised by the dissemination of well-defined plates or nodules through different parts of the brain. They vary considerably in number; range in size from that of a cherry-stone to a walnut; and seem to be most frequent in the ganglia of the cerebral hemispheres, but may involve other parts, such as the medulla, pons, cerebellum, crura cerebri, &c. In cerebro-spinal sclerosis the deposits are scattered through both the brain and cord. When the morbid condition is confined to the spinal cord, it may be diffused uniformly through more or less of its length; assume the form of disseminated and multiple points of sclerosis; or be confined to its cortical portion. Further, the disease may involve the cord throughout its entire circumference; or be confined to its antero-lateral or posterior columns. The roots of the nerves are also often implicated at the same time.

SYMPTOMS.—The clinical history of cases of sclerosis of the nerve-centres must necessarily differ according to the seat, extent, and mode of distribution of the disease, and it will be requisite to describe each chief form separately, though it must be remembered that these also present numerous variations. The ultimate effect of the morbid process is seriously to impair or completely abolish the functions of the parts involved, though during its progress signs of irritation may be evident.

1. *Diffuse cerebral sclerosis.*—In this variety the mental faculties either remain undeveloped to a variable degree, or become impaired if the disease sets in later in life. The patient never learns to talk, or speech becomes imperfect or lost after it has been acquired. Usually more or less hemiplegia is observed, with arrest of growth, contractions, and distortions of the affected limbs, in which sensation may be also impaired. One or more of the special senses are usually enfeebled or lost. Many of the patients suffering from this complaint belong to the class of idiots or imbeciles, whose habits are filthy, and who pass their excretions involuntarily. Frequent attacks of epileptiform convulsions are not uncommon during the progress of the lesion, with signs of cerebral irritation at the early period. The progress is very chronic, and patients often live to an advanced age.

2. *Multiple cerebral sclerosis.*—It will be readily understood that the symptoms are liable to present considerable modifications in dis-

seminated sclerosis, but the most frequent phenomena are such as have been described as characteristic of one form of paralysis agitans. Hammond describes a typical form of the disease, in which the cerebral hemispheres are mainly involved, of which the following is an epitome: —The progress is almost invariably slow, and in the early stage the chief symptoms are sharp paroxysms of pain in the head, of short duration, with occasionally a permanent feeling of fulness or constriction; and disorders of sensation in other parts, such as hyperæsthesia, numbness in the fingers or toes on one side, or sometimes darting pains like electric shocks. In exceptional cases an epileptic seizure reveals the disease. Motor disturbance is first indicated by tremors or trembling, which may not be observed for a considerable time. The tremors generally begin in a limb, involving it throughout, or being limited to groups of muscles, or even to a single muscle. Sometimes they commence in other parts, such as the head or eyelid. Their usual tendency is to become more intense and to extend gradually and in a lateral order, so that ultimately all the limbs may become implicated, as well as in many cases the head, eyelids, eyeballs, lips, muscles of the lower jaw, tongue, or perhaps even those of the pharynx or larynx. At first the trembling may only be noticed when the patient is quiet and his attention is not occupied. It is not merely set up when voluntary movements are performed, and is for a long time to some extent under voluntary control, though undue effort to restrain it may have the contrary effect. A change of posture often quiets the movement for a time. Emotional disturbance of any kind increases it. For a considerable time it ceases during sleep, but finally becomes constant. In exceptional cases the tremors commence as violent paroxysms, which the patient cannot restrain, and these increase in frequency until they become permanent.

After a variable interval paralysis gradually sets in, this symptom usually following the tremors, and taking the same progressive course, except in the muscles of the face, where it may arise independently. Ultimately the loss of power may terminate in hemiplegia or general paralysis, the muscles of the head, trunk, face, and eyes being involved, as well as those of deglutition, speech, and respiration. Contractions and distortions of the limbs may follow, especially of the upper extremities. Inability to maintain a continuous muscular contraction, and impairment of the power of co-ordination are prominent symptoms. The patient also loses the knowledge of the situation of the different parts of the body. Electric contractility is not impaired. The attitude and gait become peculiar. " In standing the body is generally inclined forward, the head falling towards the chest, the trunk flexed at the pelvis, and the knees slightly bent. In walking the action is similar to a jog-trot, the body being still inclined forward, and the patient often moving with considerable rapidity." There is in many cases a strong tendency to plunge forward, causing the patient to seize upon some fixed object; hence it is easy to ascend a staircase, but difficult to descend. This peculiar mode of progression is termed " festination." Sometimes the tendency is to go backwards.

As the disease progresses, disorders of sensation become more marked, and the special senses are more affected. White atrophy of the disc is revealed in many cases on ophthalmoscopic examination.

In the last stage the patient becomes quite helpless, and unable to speak or swallow, the constant tremor causes abrasion of the skin, sleep is prevented, urine and fæces are passed involuntarily, the mind is enfeebled, and death ensues from gradual exhaustion, coma, or convulsions. The average duration is about five years.

3. *Cerebro-spinal sclerosis.*—This variety is particularly liable to irregularity and want of uniformity in its symptoms. These are in many respects similar to those just described, but they present some peculiarities. Sometimes the disease begins in the brain, and the phenomena point to this organ as being the seat of mischief; but generally the cord is first involved, and in most cases spasmodic jerkings or twitchings of the limbs are first observed, owing to inflammation or congestion of the spinal meninges. The peculiar features of cerebro-spinal sclerosis are that paralysis is usually noticed before the tremor; while the latter is only evident when a voluntary movement is made. The legs are generally much more paralysed than the arms, and they are very liable to bed-sores. Ultimately the condition becomes much the same as in multiple cerebral sclerosis, but the mind in the great majority of cases remains clear to the last, the hemispheres not being often involved.

4. *Spinal sclerosis.*—One form of sclerosis of the spinal cord has been already described, viz., locomotor ataxy. It is unnecessary to discuss at any length the symptoms resulting from the different modes of distribution of the morbid condition through the cord. In the early stage there may be signs of meningeal irritation, in the way of muscular twitchings and jerkings, with pains shooting from the spine. Then indications of gradual destruction of the functions of the part affected are observed, varying according to the upper limit of the disease. When the antero-lateral columns are involved, paraplegia is developed by degrees, or the paralysis may extend more or less up the body, or even to the arms. The gait often becomes peculiar. Reflex and electric contractility are usually increased. Tremor is never observed, unless the disease extends to the brain, but the paralysed parts are liable to muscular fibrillary contractions, or to twitchings or jerkings of the limbs. The muscles often waste. The bladder and rectum are usually implicated, but not necessarily. Deglutition and respiration become affected when the disease is situated high up in the cord.

DIAGNOSIS.—The different forms of sclerosis have to be distinguished in the first place, from other diseases; and, secondly, from each other. The chief diseases for which they may be severally mistaken are as follows:—*Diffused cerebral* for simple atrophy of the brain; cerebral tumour; or, in persons of advanced age, for cerebral hæmorrhage, embolism, or thrombosis. *Multiple cerebral* or *cerebro-spinal* for functional paralysis agitans, the characteristic features of which will be again described; chorea; or tremor following hemiplegia from cerebral hæmorrhage or any other cause. *Spinal* for softening of the cord, from which sclerosis is distinguished by the preliminary symptoms of meningitis, peculiar gait in many cases, less complete paralysis, and slower progress. The distinctions between the varieties of sclerosis have been sufficiently indicated in their several descriptions.

PROGNOSIS.—In the great majority of cases this is very unfavourable, the disease tending to progress, but in some instances treatment seems to delay the disease, while symptoms may be ameliorated, and, it is said, even a cure may be brought about occasionally.

Treatment.—It is important in all varieties of sclerosis to maintain the general health by means of good diet, tonics, cod-liver oil, strychnine, and such remedies. Passive exercise in the open air may be of service. If any syphilitic taint is suspected, iodide of potassium and bichloride of mercury should have a fair trial. Hammond recommends, when sclerosis affects the brain, chloride of barium, gr. i, three times a day, and tincture of hyoscyamus, ʒi, ij, morning, noon, and night. In the spinal form, if there are signs of congestion in the early stage, he gives ergot; later on, nitrate of silver and cod-liver oil. Various baths have been employed, but are of questionable use. Electricity is often of much service. The primary current should be applied along the nerve-centres and to tremulous muscles, and the induced current to paralysed parts. Symptoms must be attended to as they arise, and cleanliness strictly enjoined.

VI. Paralysis Agitans.—Shaking Palsy.

It has been customary to describe paralysis agitans under the two forms of *senile* and *non-senile*. The cases classed under the *senile* variety, however, are merely those of multiple cerebral or cerebro-spinal sclerosis. It only remains here to allude briefly to the *non-senile* form. This is presumed to be a functional disorder, or at any rate no definite organic lesion has as yet been made out.

Etiology.—This complaint has been mainly attributed to violent emotion, long-continued anxiety or grief, continuous or severe exertion, injury, and exhausting diseases. Special varieties of paralysis agitans have been described as *hysterical*, which occurs in hysterical persons; *reflex*, due to some reflex irritation (worms, wounds, &c.); and *toxic*, resulting from the action of some poison upon the system (mercury, alcohol, tobacco, tea, or coffee). The persons affected may be of any age, and are usually under 50.

Symptoms.—The chief symptom is tremor, either very limited or more or loss extensive, and usually exhibiting little or no tendency to advance. It is independent of voluntary movements, but may be controlled by holding the affected part. Mental excitement, fatigue, and depressing influences increase the movement, which, except in extreme cases, ceases during sleep, and may present intermissions during the day. Diminution in muscular power is perceptible but not marked as a rule. Sensibility is not affected, and there are no head-symptoms or festination. The duration is indefinite, there is no fatal tendency, and in many cases, especially if the cause can be removed, a cure may be effected.

Diagnosis.—Paralysis agitans might be mistaken for multiple cerebral or cerebro-spinal sclerosis, or for chorea. Attention to the etiology and symptoms alluded to above will enable the diagnosis to be made.

Prognosis.—Death is a very rare event from paralysis agitans. It may prove a very difficult complaint to cure.

Treatment.—The indications are to remove the cause; give good diet; avoid fatigue and mental excitement; improve the general health and condition of the nervous system by strychnia, iron, phosphorus, arsenic, zinc, and similar remedies; administer sedatives, such as bromide of potassium, opium, conium, or cannabis indica; and apply the constant current along the affected muscles and over the spine. Baths and friction might also be of service.

VII. GLOSSO-LABIO-LARYNGEAL PARALYSIS.

ETIOLOGY.—The causation of this rare affection is very obscure, and in the majority of cases its origin cannot be made out. The disease has in some instances been attributed to syphilis, rheumatism, mental anxiety or worry, or excessive application to business. It seems to be most common in middle-aged adults.

ANATOMICAL CHARACTERS.—The lesions which have been discovered consist in atrophy and destruction of the nerve-cells forming the nuclei of origin of the hypoglossal, facial, spinal accessory and pneumogastric nerves, in the medulla oblongata and upper part of the spinal cord. Afterwards the disease affects the roots, and may extend along the trunks of the nerves. It may also pass down the cord more or less. The paralysed muscles present a healthy aspect.

SYMPTOMS.—The chief clinical phenomena depend upon paralysis of the muscles of the tongue, palate, and pharynx, and of the orbicularis oris. In course of time the larynx and respiratory muscles become involved. In the great majority of cases the tongue is first affected, which is indicated by some embarrassment of speech and impaired articulation. Especially difficult is it to raise the tip of this organ to the roof of the mouth, or to bring it against the upper teeth; hence words beginning with lingual and dental consonants give most trouble. Then dysphagia is experienced, particularly as regards fluids, which are apt to pass into the larynx or through the posterior nares, causing much distress and danger. Consequently saliva accumulates in the mouth, assuming a viscid, glutinous, stringy character, and it flows out instead of being swallowed. Food collects between the gums and cheeks, because the tongue cannot remove it. When the orbicularis oris becomes involved, the lips remain apart and cannot be closed, so that the teeth are exposed, and the patient presents a peculiar and most unpleasant aspect. In time articulation and deglutition become impossible, the tongue remains at the bottom of the mouth as a sodden, inert mass, and the patient has to be fed. General debility results, in consequence of the interference with nutrition. Subsequently the implication of the respiratory muscles leads to difficulty of breathing, and inability to cough; while, when the larynx is affected, voice becomes absolutely lost. The mind is usually clear to the last, but the emotions are easily excited. If the disease extends down the cord, muscular atrophy or paralysis is observed in the corresponding muscles. This disease always proves fatal, death resulting either from gradual or sudden asphyxia; exhaustion; interference with the cardiac action; or from some intercurrent complaint.

DIAGNOSIS.—The conditions for which glosso-laryngeal paralysis might possibly be mistaken are simple paralysis of the tongue; facial paralysis, especially double; general paralysis of the insane; progressive muscular atrophy beginning in the tongue, lips, or palate; and diphtheritic paralysis.

PROGNOSIS is exceedingly grave, the termination being always fatal.

TREATMENT.—Galvanism might be tried, but is of little service. The patient should be fed on nutritious food, enemata or the stomach-pump being employed if necessary. No medicine has been found of any real use in this disease.

CHAPTER LXXXVII.

DISEASES OF THE SKIN.

A CONSIDERATION of the offices and functions of the skin is of great importance alike to the physiologist and the practitioner of medicine. As an external integument the skin affords a soft and flexible protection to the delicate vascular tissues beneath, and as the seat of the distribution of the peripheral terminations of many of the sensory nerves, it serves as an important and exquisite organ of the sense of touch. But it has other functions which are equally important to the animal economy. By means of its sebaceous and sudoriparous glands the skin secretes and excretes a large amount of fatty matter, sweat, and nitrogenous products, and exhales a great quantity of water and some carbonic acid gas. In addition to these properties, it is also capable of some degree of absorption of fluids and drugs. The functions of the skin, therefore, correlate those of the kidneys, lungs, intestinal mucous membrane, and probably also some of those of the liver and other emunctory organs. These facts have not been overlooked by physicians who not unfrequently make use of the skin to relieve by diaphoresis the action of the kidneys or lungs when either of these organs is acutely inflamed. But, on the other hand, dermatologists have, as a rule, been slow to return the compliment by making the kidneys, lungs, and intestines do the work of a disabled skin. The truth is that, hitherto, diseases of the skin have been looked upon as peculiar in their nature and altogether different from the morbid changes that occur in other tissues, and to be treated therefore in some special way. The ordinary rules of practice have, in consequence, been too commonly neglected in the treament of skin affections. It will be, however, one of the objects of this chapter to endeavour to show that really few pathological changes occur in the skin that may not—allowing for differences in situation and structure—be repeated in the other tissues and organs of the body.

If more care were taken to elicit all the facts in the histories of the cases brought before us, and more pains were bestowed upon the elucidation of the pathological relations of the various morbid phenomena that the skin presents, it would be found that a very large number of diseases of the skin are really directly or indirectly due to changes in the internal viscera or in the vascular or the nervous system. Many, I feel sure, are neurotic, but this is not the place to attempt to differentiate between idiopathic diseases of the skin and symptomatic diseases or diseases which are, as it were, merely the cutaneous reflection of internal changes. Let it suffice for our purpose that the term "skin-disease" applies to every deviation from the normal condition of the structure and function of the skin and its appendages, the glands, hairs, and nails. In the following pages, however, only those diseases will be discussed, and that very briefly, that are likely to come under the notice of the medical practitioner and student in this country. Nor shall we consider those affections that have, by tradition and custom, been unreservedly given up to the charge of the surgeon. An account of these may be found in surgical works.

But in order to study diseases of the skin intelligibly and profitably, we must adopt some method of classification. The best method, perhaps, would be an anatomico-pathological one, the different diseases being divided into two great classes, namely, those having a constitutional origin, and those purely local, and peculiar to the skin itself, the morbid changes themselves being distinguished by the particular portion of the cutaneous tissue they affect. Unfortunately, such a classification is, in the present state of our knowledge, impossible.

Many skin affections are clearly dependent on constitutional conditions, and many are purely local, but there is an intermediate class which is sometimes local, sometimes constitutional. For instance, some diseases which are local may be aggravated or determined by constitutional conditions, while many affections having their real origin in some morbid condition of the general system, are determined by some cause acting locally. On the other hand, a strict anatomico-pathological classification would be liable to become too complicated by the never-ending extensions and modifications of morbid action.

In this country, the system first proposed by Plenck, and subsequently adopted and elaborated by Willan, is the one most commonly accepted; but although it possesses certain practical advantages, it is open to the grave objection of including in the same order diseases which, beyond possessing one perhaps insignificant common character, are widely different.

The following plan, which resembles that adopted by Dr. Tilbury Fox, seems to possess the advantages of the Willanean system, on which, indeed, it is founded. It is, however, free from some of the faults of that system, and may be taken as that best adapted for the purposes of clinical study, and most likely to prove subservient to modern educational requirements.

Diseases of the skin may be classified as follows:—

1. THE ERUPTIONS OF THE ACUTE SPECIFIC DISEASES.—These have already been fully described.

2. INFLAMMATIONS, comprising—*a.* The *Erythematous*, as erythema, roseola, and urticaria. *b. Catarrhal*, as eczema. *c. Bullous*, as herpes, pemphigus. (?) *d. Suppurative*, as ecthyma, impetigo, impetigo contagiosa, and furunculus. *e. Papular*, as lichen and prurigo. *f. Squamous*, as psoriasis, pityriasis simplex, and pityriasis rubra.

3. DIATHETIC AFFECTIONS, due to some constitutional change or disposition, as struma, syphilis, leprosy.

4. HYPERTROPHIES, as xeroderma, ichthyosis, corns, warts, and papillary tumours, keloid, molluscum fibrosum, elephantiasis arabum, &c.

5. ATROPHIES, as general or local atrophy of the skin or its appendages, and senile decay.

6. NEW FORMATIONS.—Lupus, rodent ulcer, cancer, melanotic sarcoma.

7. HÆMORRHAGES, as purpura, which has already been described.

8. NEUROSES, as hyperæsthesia, anæsthesia, pruritus, angioneurosis.

9. PIGMENTARY CHANGES.—*a. Increased*, moles, melasma, chloasma, lentigines. *b. Diminished*, leucopathia, albinism.

10. PARASITIC DISEASES.—*a. Dermatozoic*, as scabies, phtheiriasis. *b. Dermatophytic*, as tinea favosa, tinea tonsurans, tinea kerion, tinea circinata, tinea sycosis, tinea versicolor, onychomycosis, and, according to some, tinea decalvans.

11. DISEASES OF GLANDS AND APPENDAGES.—*a. Sweat glands*, miliaria, sudamina, lichen tropicus, dysidrosis, hyperidrosis, anidrosis, chromidrosis. *b. Sebaceous glands*, seborrhœa, comedo, acne, milium, molluscum contagiosum, xanthelasma, steatoma. *c. Hairs and their follicles*, sycosis, alopecia, calvities, fragilitas, polytrichia. *d. Nails*, atrophy, hypertrophy, and onychia.

ERYTHEMATOUS INFLAMMATIONS.

Under this heading will be described only the exudative erythemata, all of which are characterised by redness, due to hyperæmia of the capillaries of the papillary layer of the skin, and by the exudation of a certain amount of serous fluid into this layer and into the rete Malphighii. The exudation may in some instances be so small as to be entirely overlooked, and in others sufficient to cause swelling of the epidermic cells as in the wheals of urticaria, or even to form vesicles or bullæ, as in the vesicular and bullous varieties of urticaria. The redness readily disappears on pressure, but returns immediately the pressure is removed. When the congestion subsides there is generally more or less of furfuraceous desquamation of the cuticle detached by he exudation. The exciting causes are local and constitutional. In the former the hyperæmia and exudation are almost the only phenomena present; but in the latter some febrile reaction, which is sometimes very severe, usually precedes the appearance of the redness. The duration varies from a few hours to several days.

Erythema is a diffuse or circumscribed inflammation of the superficial parts of the skin characterised by the presence of slightly elevated, red patches of various sizes, the colour of which shades off towards the edge. The redness disappears under pressure, leaving a yellowish stain, due to the presence of serum in the lower layer of the cuticle, but at once returns when the pressure is removed. There is generally heat, tingling, and itching, and sometimes severe pain, together with a certain amount of constitutional disturbance, but the actual course varies according as the disease is of local or constitutional origin. When the redness is due to friction of two folds of skin, or to the irritation produced between them by retained secretion, it is called *erythema intertrigo*. The redness that is sometimes seen on the hot, tense, fissured skin of œdematous legs, and which occasionally leads to superficial ulceration, is named *erythema læve;* and the redness of an unbroken chilblain has received the dignified appellation *erythema pernio.*

But more important than these are the constitutional varieties. In *erythema papulatum seu tuberculatum* there are papular red patches and tumefactions scattered about the body, but more particularly on the dorsal aspects of the hands, arms, feet, and legs, generally attended with a disagreeable burning sensation, and a certain degree of fever. In a few days the redness disappears, leaving papules covered with fine scales of desquamating epidermis. In a short time, the disease passes off entirely, no secondary changes, as pigmentation or thickening, so frequently seen in purigo, remaining. In some rare instances the disease becomes chronic. The disease is most common in the spring and autumn, and chiefly occurs in children and young adults. Several minor varieties have been named after the accidental shapes that the patches sometimes assume, as *erythema iris, circinatum, gyratum;* while the term *erythema fugax* is given to the transient red patches that sometimes show themselves on the neck and face after errors of diet, &c. The most important variety, however, is that called *erythema nodosum,* which consists of well-defined oval or circular, slightly elevated, red patches, from a quarter of an inch to an inch and a half in diameter, which usually occur on the front of the legs parallel to the tibia, the swelling and redness gradually shading off into the surrounding tissues. In a day or two the swellings, which were at first pale and then yellow, assume a purplish tinge, and soften in the centre, but never suppurate, and finally disappear with desquamation of the cuticle. The disease is, however, liable to recur, especially if the health remain impaired. Sometimes the patches which are due to a serous exudation in the deeper layers of the skin, show themselves on the upper limbs, and also on the face. The disease is met with for the most part in children, especially girls, and in delicate adults, and is generally preceded by some febrile disturbance, and has been observed to be frequently associated with acute rheumatism.

Roseola is a non-contagious, febrile disease, accompanied by the eruption on the skin of minute, rose-coloured, non-crescentic spots, which are generally attended with considerable itching and tingling. There is not necessarily any catarrh, and the eruption is very irregular in its situation and extent. The disease is frequently seen in infants, hence the term *roseola infantilis,* and the variety which occurs from exposure to the sun in summer is called *roseola æstiva.* The redness, which is usually preceded by some constitutional disturbance, lasts from a few hours to several days. A roseolous rash sometimes precedes the outbreak of the variolous eruption or an attack of typhus fever, and sometimes it makes its appearance four or five days after vaccination. It is often seen also in gouty or rheumatic persons, and may occur in cholera. All these varieties have been honoured with special names. Certain medicines, as belladonna and copaiba, may produce a roseolous rash on the body, which rapidly disappears on the discontinuance of the drug.

Urticaria is due to the rapid serous infiltration of the cells of the lower layer of the epidermis, which results in the formation of slightly elevated, pale patches of various shapes and sizes known as "wheals."

at this is the true cause of the wheal may be proved by puncturing swelling and letting out the transparent clear serum. The operation, wever, requires to be done with very great care, for, if the point of the edle pass beyond the rete Malpighii the vascular papillæ will be idily made to bleed. This explanation is, moreover, confirmed by fact that the exudation is sometimes sufficient to raise the cuticle d produce a vesicle or even a bulla, as in *urticaria vesiculosa vel bul- a*. The disease may be acute or chronic, and due to local or con- tutional causes, or to the presence of certain poisons in the blood. iere are, therefore, many distinct varieties of urticaria, all of which iy, perhaps, be ultimately traced to the same cause; namely, irrita- n. The irritation is not, of course, always the same. Sometimes it ses from something applied to the skin and sometimes to something thin. There are, therefore, *urticaria from external irritants*, as the es of insects and the stings of nettles, and urticaria from irritants that ve gained admission into the body by the food, *urticaria abingestis*, as ell-fish, certain kinds of fruits and some drugs as belladonna, copaiba. rticaria is common in gouty persons especially if the skin be irritated, d it may occur in any one whose system is surcharged with waste oducts. It is also liable to appear in women who suffer from amenoræa or other uterine disturbance (*urticaria uterina*), and may occur from stro-intestinal disturbance of any kind. In such instances the skin sion is distinctly neurotic and reflected. When pyrexia accompanies e formation of wheals the disease is called *urticaria febrilis*. If the sease recurs again and again or continues for a long time, it is termed *ticaria chronica*. There is, lastly, another variety, which is seen in ildren, in whom from gastro-intestinal disturbance, or from mere local itation, an obstinate urticaria is developed which leaves behind a op of papules due to the engorgement of the papillæ and follicles of e skin. This has been called *urticaria papulosa*, or *lichen urticatus*.

There is always a considerable amount of itching and tingling, which ay last a few minutes or for many days. The constitutional symptoms e not usually severe, but sometimes there is high fever, vomiting, dry ngue, and even delirium. The wheals are, as a rule, very transient, d do not usually last more than an hour or two, but sometimes they st many hours, and even days. The paleness of wheals is owing to e pressure which the exuded serum exerts on the papillæ.

TREATMENT.—It will be seen that constitutional and local remedies ll be necessary in the majority of the cases, but in all the cause must removed. Locally, soothing applications are best, as the various eparations of zinc, calamine, lead, &c. Excoriated surfaces must be otected, and where the surface is chafed by the friction of two folds of in, the parts must be kept dry and separated by folds of lint on which me absorbent and soothing powder has been sprinkled. All local d internal irritants must be removed. An occasional mild purge and ht diet for a day or two is all that will be necessary in most cases. henever the disease is due to poisonous food, the stomach should be at ce emptied by emetics. In erythema nodosum, however, quinine ne or combined with some preparation of iron, will be found very eful in preventing the recurrences.

Catarrhal Inflammation.

Much contention and not a little confusion have arisen out of the attempts to define what is really meant by catarrhal inflammation of the skin. According to some writers the inflammation is not catarrhal unless there be a visible serous exudation into the upper layers of the skin and on its surface. Anything short of this or beyond it, is not in their opinion catarrhal. Such limitations appear not only unnecessary but illogical. There are some cases of inflammation of the skin in which there is just sufficient exudation to cause furfuraceous desquamation of the epidermis, while in others the exudation pours out in enormous quantities so as to saturate the clothing and dressings of the patient. In other instances again the inflammatory processes may go on to actual suppuration with the formation of large thick crusts. The definition of eczema, therefore, should be sufficiently wide to embrace all the inflammations of the skin that present the characters hereafter to be described. The plan is sometimes followed. When the serous exudation is very scanty the disease is termed *eczema siccum*. When more copious so as to give rise to weeping of the diseased surface *eczema humidum vel serosum*, and where there is free formation of pus, *eczema pustulosum v. suppuratorium*. We should, if we wish to comprehend all the phenomena of eczema, banish from our minds the narrow notion that eczema is always a vesicular disease. The vesicles in eczema are, as it were, mere accidents, in the sense that they depend on the nature of the inflammation, on the quantity of serous exudation, the situation of the disease, the character of the epidermis in the affected parts, and to some extent on the exciting cause, and on the constitutional condition of the patient. It is true that vesicles are among the most common manifestations of the early stages of eczema, but they are no more essential than the so-called papules or pustules. In some cases the inflammatory effusion is so great that the neighbouring tissue becomes œdematous, especially when there is much loose connective tissue. Œdema of the eyelids and swelling of the face is, indeed, often one of the earliest indications of acute eczema of the face.

Eczema may therefore be defined as an inflammation of the skin, with cell-proliferation and exudation into the papillary layer of the cutis and into the rete Malpighii giving rise to thickening and infiltration of the skin and the formation of papules, or closely packed vesicles, or pustules which soon run together, burst, and expose an excoriated, reddened surface discharging a fluid which dries into yellowish or brownish crusts. Sometimes for days or even weeks before eczema breaks out the skin itches, is dry, harsh and red, and covered with fine brown scales; or, the patient scratches and rubs the part and determines the outbreak of an acute attack of eczema. Before the discharging stage is reached there is generally considerable pain, heat, redness, and swelling, in fact all the classical symptoms of inflammation. Fresh crops of vesicles come out from time to time, but sooner or later the discharge diminishes in quantity, the redness gradually fades, and the swelling subsides, leaving a dry reddish patch covered with thin scales, which may speedily disappear or remain for many weeks or even for months.

It must not be imagined that because it has been stated that a pap y be the initial lesion of eczema, by that term is meant exactly e same thing as a lichenous papule. Lichen is quite distinct and parate from what is ordinarily regarded as eczema in almost every spect—in the nature of the lesion, its seat, its course, and its termi- tion. All that it is intended to imply by the papular stage of eczema is e effusion of a quantity of serum just sufficient to form a papule, but t enough to produce a vesicle.

The causes of eczema are constitutional and local, among the former which may be mentioned dyspepsia, sluggish action of the liver or dneys, and gout. Anything that irritates the skin locally may produce zema; the disease is also very apt to occur on the congested skin of gs in which the veins are enlarged and varicose.

In the simplest form it is called *eczema simplex*, but when there is uch inflammation and great redness, with heat, swelling, and perhaps so pyrexia, it has been named *eczema rubrum*. Other varieties have en designated according to the seat of the disease, whether on the alp, ear, face, hands, nipple, &c.; but the disease is pathologically e same in every case. It may, however, be remarked that when there much pus formation, or when the disease commences with pustules, has received the special name of *eczema impetiginodes* or *impetigo*. hen the patches are dry and covered with thick hard scales, the dis- se is called *eczema squamosum*. The term *eczema marginatum* has en given by Hebra to a variety which commences on the inner part the thigh against which the scrotum lies, by a small and circular coriated patch which spreads upwards to the abdomen and back- ards to the buttocks, but leaves the penis untouched. Eventually, e disease may reach the upper part of the chest by extending at the eriphery at the same time that the centre clears. It is most com- only seen among shoemakers and horse-soldiers. By some it is garded as being syphilitic, and by others as parasitic, due to the tri- hophyton tonsurans, the latter view being correct for the majority of ses. There is, lastly, a variety of chronic eczema which is more fre- uent than is commonly imagined. The disease is characterised by rcular patches, especially on the back of the hand and on the fore- rm. There is not much discharge and only little crusting, but the ching is often intense. On examining microscopically the crusts of veral of these cases I have often found some of the trichophyton ngus, and it would seem that these cases are really inflamed patches f tinea circinata. Certain it is, they readily recover under parasiticide eatment. This variety may, therefore, be *eczema parasiticum*.

When eczema has lasted some time, the skin becomes thickened, nfiltrated, and fissured (*eczema rimosum*). The papillæ become en- rged and infiltrated with cells, and there is also increased pigmentation nd staining.

There is a very obstinate form of eczema that occurs on pale, ill- eveloped, ill-nourished xerodermatous skins. This variety which may ometimes last a life time is most common on the extremities, espe- ially in the flexures, and is often attended with some superficial ulcera- ion. It gets better and worse from time to time, but is always aggravated y a stormy damp state of the atmosphere, or by any deterioration in the atient's health. Although much may be done by protecting the skin to alleviate the pain and discomfort, the disease itself is often incurable notwithstanding all the ordinary forms of treatment.

TREATMENT.—The treatment of eczema must necessarily vary so much in all cases, that it would be useless in these pages to attempt to do more than to give a few general hints. Every case must be treated on its merits. It may be laid down as a general rule that in the acute stages the skin should be protected and soothed; later on astringents may be used, and when the redness and discharge have subsided, mild stimulants and absorbents should be carefully employed. The various functions of the body must be attended to, and the free action of the kidneys, liver, and intestines ensured. In the acute stages great benefit will be derived from the administration of alkaline diuretics with occasional small doses of colchicum. All stimulants, such as alcohol, coffee, savoury dishes, and seasoned food should be strictly prohibited as long as there is much inflammation. In weak debilitated persons cod-liver oil and quinine and iron will prove of great service. Arsenic sometimes answers well in chronic cases, especially where there is much thickening and scaliness, but in the acute stages this drug should not be employed.

Locally, the treatment should vary with the stage of the disease and the condition of the tissues. When there is great inflammation and copious discharge, warm or cold water dressings are best, and the diseased surface should be kept clean and free from crusts. If the discharge be hot and irritating, an alkaline lotion containing bicarbonate of soda and borax will afford great relief. An oxide of zinc lotion with prepared calamine or a weak lead lotion will not unfrequently alleviate the pain, check the discharge, and expedite the cure. If the disease extend over a wide area, the application of carron oil or equal parts of almond oil and lime water will both soothe and protect the surface. When the disease has become sub-acute, the writer has found a lotion containing two or three grains of chloral hydrate to an ounce of camphor water, a most valuable application. The rapidity of the cure in some cases even of long standing has often been quite surprising. It must be observed, however, that the first few applications of the chloral hydrate lotion sometimes cause smarting, which lasts for half an hour or so, but no inconvenience is complained of after the lotion has been used a few times.

The thickening and infiltration that are so often seen in chronic cases of eczema may generally be removed by the use of a lotion containing one drachm of liquor potassæ to two ounces of water, or by the cautious application of soft soap. Weak preparations of tar will often serve to cure a case that has long resisted all other modes of treatment. An ointment containing five grains of ammoniated mercury and ten grains of precipitated sulphur to an ounce of lead, is very useful in eczema of scalp, face, and hands.

Eczema marginatum must be attacked by parasiticides. For this purpose the strong ammoniated mercury ointment is useful, but better and cleaner than this is a lotion containing two grains perchloride of mercury in half an ounce of dilute acetic acid and half an ounce of water. Glycerine and borax or a carbolic acid lotion or ointment from 1 to 12 to 1 to 20, or a hyposulphite of soda lotion will answer equally well.

I have frequently found the daily employment of the continuous electric current very valuable in that form of chronic eczema, which occurs in xerodermatous states of skin. By this means I have succeeded in curing in the course of a few weeks cases that had resisted all other modes of treatment for years. The *modus operandi* of this therapeutic measure seems to be according to the well-known action of the continuous current on the nutrition of tissues.

BULLOUS INFLAMMATIONS.

Many authorities include under this heading rupia, ordinary herpes, and pemphigus. But as rupia is always syphilitic, it will be described with the syphilitic diseases of the skin. It would, perhaps, be more correct to regard the bullous diseases as neurotic, but as our information is not yet quite complete, we shall adhere for the present to the more popular clinical classification. It may, however, be remarked that herpetic eruptions always bear some anatomical relation to the distribution of the cutaneous nerves, and in this fact we may look for some elucidation of its pathology. Overwhelming evidence has of late years been adduced to prove that herpes is really due to some change in the nerves. Bärensprung has found in a case of herpes zoster an irritative overgrowth of cells within the neurilemma of the spinal nerves and their ganglia. Charcot has furnished similar evidence, which has been further confirmed by a case recently recorded, in which there was an outbreak of frontal herpes when the Gasserian ganglion was involved in a cancerous mass, that had spread from the face.

A bulla or herpetic vesicle is produced by the superficial inflammation of the skin and the rapid exudation of a large quantity of serum into the papillary layer and into the rete Malpighii, causing the formation of a bladder or bleb. The course varies, and may be acute or chronic, and the disease is very apt to recur.

Herpes may be defined as an acute, non-contagious disease which runs a definite course, and in which groups of vesicles appear on a reddened portion of the skin. These groups which vary much in size do not come out simultaneously, but follow one another at irregular intervals. The outbreak of an herpetic eruption upon the lips and on the mucous membrane of the hard and soft palates of patients suffering from certain febrile affections, but especially pneumonia and cerebro-spinal meningitis, is generally regarded as a favourable prognostic sign. Herpes may, however, appear on persons previously apparently quite healthy.

The disease is liable to occur at all ages and in both sexes, but it is most common between the ages of twelve and fourteen. It is said not to occur in babies, but I have seen a well-marked case at University College Hospital in an infant two months old.

Several varieties have been named according to their seat, as *herpes frontalis*, *facialis*, *labialis*, *preputialis*, while the term *herpes zoster* or *zona*, or shingles, is given to the variety which occurs on the trunk. But all these forms are, no doubt, essentially identical.

The disease usually commences with a pricking, burning pain, which is sometimes severe and is frequently preceded by fever. In a few hours red points appear on the skin along the course of a particular nerve, and within twenty-four hours a group of clear watery vesicles or small bullæ is seen on the reddened base. The pain now usually subsides, but it may last for days or weeks, or may return long after the eruption has disappeared. The contents of the vesicles soon become turbid, and in a few days dry up into brownish scabs, which fall off in about ten days, leaving little cicatrices which may or may not remain. The eruption is generally entirely confined to one nerve, and rarely extends far beyond the mesial line of the body, and still more rarely is it found symmetrical or on both sides of the body. Occasionally, distressing constitutional symptoms precede the appearance of the vesicles, and in some of the cases where the eruption has appeared on the face, the severity of the preceding symptoms had led to the diagnosis of serious affection within the cranium. But all these symptoms usually subside on the appearance of the vesicles. In some cases where the eruption has followed the course of the ophthalmic division of the fifth, serious and even destructive inflammation of the eyeball has been observed, especially when the nasal branch of the nerve has also been affected.

It frequently happens, especially in the form that occurs on the prepuce or on the dorsum of the penis, that the disease recurs with a degree of periodicity, the intervals varying from a month to a year or more. It has been stated that herpes on the external genitals is always the result of venereal disease, but this is not true. Many chaste persons, both male and female, are affected with a troublesome form of herpes in these parts. It has occurred to me to meet with two cases in which syphilis was contracted while the patients were suffering from herpes of the penis, and for years afterwards the herpes returned at intervals apparently quite uninfluenced by the syphilitic taint.

The affection commonly known as *herpes circinatus* is probably always of parasitic origin, and is not, therefore, an herpetic eruption in the sense in which we have been speaking.

TREATMENT.—As the disease is self-limited, the duty of the practitioner is simple. He cannot hope to hasten or retard its progress. If the parts be protected by cotton-wool and some cooling powder, as starch and oxide of zinc, all that is necessary will have been accomplished. Subsequently, quinine combined with small doses of iodide of potassium may be found of great benefit, and should the pain recur or never entirely subside, the application of a belladonna plaster or inunction with belladonna ointment will be found useful.

Pemphigus.—In this disease there are large isolated bullæ, filled with clear fluid upon a slightly reddened but not hardened base. The lesion, in fact, resembles an ordinary blister. The cause is very obscure. It occurs on the palms and soles of newly-born children as the result of syphilis, and is then nearly always fatal. It is more common in children than adults, although I have seen a well-marked case in an old man over sixty years of age. Generally, the eruption is preceded by ill-health and cachexia, but sometimes the patient is apparently in good health.

The disease commences as a red discoloration, which itches and burns. Upon this a bulla forms, which may from the first acquire its full size, or commence as a small vesicle which rapidly increases in size. At first the bulla is tense, round, or oval, with clear contents, and varies in size from a pea to a hen's egg. In a day or two the contents, as well as the cuticle, become opaque. In cachetic persons the contents are often mixed with blood. In two or three days the bleb bursts, and leaves a moist discharging excoriation, which soon becomes covered with a scab, under which new epidermis forms. For a long time afterwards a pigment stain, but not a cicatrix, marks the site of the old bulla. Before one set of bullæ has disappeared fresh crops spring up, which are themselves succeeded by others, and so the disease is prolonged for weeks or even months. The *acute* form is most common in children and usually lasts from a month to six weeks, but the *chronic* form may occur at all ages and may last for many months. Sometimes only one bulla is present at a time, as in *pemphigus solitarius*. The extremities are the most common seats of the eruption, but it may occur on any part of the trunk.

If the disease be unchecked, the patient loses health and strength, and may ultimately die of marasmus.

In the variety of the disease known as *pemphigus foliaceus*, the disease begins as a solitary bulla, or by several small bullæ which unite and spread, until in the course of months they have increased to such an extent that the entire skin looks flayed. The bullæ of the foliaceous variety differ from those of ordinary pemphigus inasmuch as they are flaccid and their contents are, from the first, turbid. In the advanced stage of the disease the surface of the body is covered with thick dirty-looking crusts, which consist of dried serum, abortive epidermis and sebaceous matter. If the crusts are removed a raw, angry-looking surface is exposed upon which new cuticle does not form. Sometimes the disease is rapidly fatal. During the past year there have been two typical cases, both in women, of pemphigus foliaceus in University College Hospital. One of the patients, a woman about thirty years of age, died within a few weeks of admission. The other case was that of an old woman who left the hospital after about four months' sojourn, unrelieved. The disease is, however, rare in England and is commonly fatal.

If the characters of the disease as just described be borne in mind, there will be little difficulty in distinguishing herpes and pemphigus. It may, however, be observed that whereas herpes, at least herpes zoster, does not, as a rule, occur more than once, pemphigus usually recurs many times.

TREATMENT.—The treatment of pemphigus resolves itself into giving tonics and good food. Locally, but little can be done beyond protecting the skin by unctuous applications; it has been recommended to puncture the bullæ and pencil the subjacent tender cutis with a solution of nitrate of silver, ten grains to the ounce, which hardens the surface and destroys the great sensibility of the exposed skin.

PUSTULAR INFLAMMATIONS.

By this is meant diseases in which the inflammation proceeds to visible pus-formation as a primary phenomenon. We have already seen that in eczema the exuded fluid may produce a vesicle which may burst, or which may become purulent by the accumulation of pus cells within it. And, accepting the modern views of pyogeny, there is little difficulty in understanding that all the so-called catarrhal inflammations may become suppurative; that, in fact, all inflammations are attended with a certain degree of pus formation. Although, therefore, impetigo, and impetigo contagiosa, ecthyma and furunculus have been classed as suppurative diseases, only the two latter can strictly be so called, for the first is merely a phase of eczema, and the second is really a vesicular disease, which may be accompanied by slight suppuration.

One of the affections most commonly known as impetigo is an inflammation of the hair and the sebaceous follicles, and should be so described, whereas the disease generally called impetigo is really the impetigo contagiosa of Dr. Tilbury Fox, which we shall now describe.

Impetigo Contagiosa.—If some of the clear fluid from one of the vesicles of this disease be inoculated into a healthy subject, the point of inoculation remains red, and in twenty-four or thirty-six hours a minute vesicle forms preceded and accompanied by severe and almost intolerable itching. If the cuticle be not ruptured the vesicle increases in size and the contents become sero-purulent, and in two or three days dry up into flat, straw-coloured scab, under which new epidermis forms and the disease rapidly passes off. But as seen in patients the eruption is somewhat different, for it is often preceded by a little constitutional disturbance, and the vesicles which generally appear first on the face may extend to the trunk, but usually remain isolated. The fingers may become inoculated by scratching, and in turn convey the poison to other parts of the body. Sometimes the disease appears to be epidemic, and affects the whole body like one of the acute specific diseases, with the exception that it usually takes a week or more for the body to become so extensively involved. It is most commonly met with in children, but not unfrequently it affects adults. The nature of the poison is unknown, although some observers have supposed it to be a minute fungus which they have discovered in the scabs, but it is difficult to imagine that the fungus, which is met with in the crusts and which cannot be found in the clear fluid when it is most inoculative, should be the agent of contagion.

TREATMENT.—The scabs should be removed by poultices or by oil, the hair being cut short if necessary, and an ointment composed of ten grains of ammoniated mercury to an ounce of lard applied to the raw surfaces. This will serve to cure the disease in a few days.

Ecthyma.—In this disease the pustules are seated on an elevated, reddened, and indurated base. The suppuration rarely affects the tissue of the true skin, but is confined to its surface. If the true skin be affected and ulceration take place a cicatrix will result, but usually only a red mark remains, which in time clears off.

An ecthymatous eruption may be produced by the local application of tartar emetic ointment. The disease may also be produced by anything that irritates the skin, especially in cachectic subjects, and it is a common complication of scabies in children. It is sometimes met with during the course of febrile diseases, and may occur without any apparent cause in ill-nourished and debilitated persons.

The inflammation which precedes the formation of the pustule is sometimes attended by constitutional disturbance, and fever, and a good deal of shooting pain. The pustules themselves are isolated and surrounded by a broad, red areola, and are seen most commonly on the extremities and buttocks, but sometimes on the trunk. The pustules are large, about the size of a split-pea, or even much larger, and their contents often become mixed with blood. The contents soon dry up into brownish scabs which fall off in from ten to fourteen days, leaving behind red spots covered with new epidermis. Sometimes, however, suppuration continues beneath the crust, and as a result of the ulceration which takes place in the upper layer of the cutis, a permanent cicatrix results. There are two chief varieties—the acute and chronic. The former is generally accompanied by severe constitutional symptoms.

TREATMENT.—Remove local causes, as scabies, &c.; apply astringents, as subacetate of lead ointment, zinc, or lead lotion; and give tonics and good food.

THE PAPULAR INFLAMMATIONS.

In the diseases included under this heading the inflammation is accompanied by serous exudation into the papillæ and rete with more or less cell-proliferation and increased formation of the epidermis which give rise to the formation of papules and thickening of the skin. The diseases comprised in this class are *lichen* and *prurigo*. These diseases are for the most part constitutional in their origin, and require general treatment. They are usually chronic and are very apt to recur.

Lichen.—In this disease there is an inflammation of the skin, in which the exudation and the new tissue form little solid elevations called *papules*. There is also some exudation into the rete Malpighii of the epidermis, which causes fine desquamation when the disease resolves. The exciting causes are very obscure. The disease is frequently seen in strumous persons, but generally the subjects are tolerably healthy.

Lichen simplex is characterised by little papules of a pale-red colour, which do not disappear, but become paler on pressure. The skin generally feels dry and thickened. There is usually some itching and tingling, but sometimes there is no annoyance whatever. The most common seats are the back of the hands and forearm, the neck, and the thigh. The papules disappear in a week or two, and the disease terminates by desquamation of the cuticle. Sometimes, however, the disease becomes chronic, and may last for weeks or months. The disease may occur in circular patches which fade in the centre as fresh papules form at the margin, giving rise to the appearance known as *lichen circumscriptus*, and when several of these patches unite *lichen gyratus* results. *Lichen lividus* is really purpura, and *lichen urticatus* has already been described as a papular form of urticaria. In *lichen agrius* the appearance of the papules is accompanied by severe inflammation and almost intolerable itching and burning. The patches are scratched and excoriated, and pour out a serous exudation, by which the disease is made to resemble eczema. In *lichen pilaris* the papule is situated at a hair follicle, and the disease is characterised by the passage of a hair through the centre of the papule which consists of dried serous exudation and epidermic accumulation.

Hebra has described a variety of lichen, which he has designated *lichen exudativus ruber*, and which seems to be an aggravated form of the *lichen planus* of Mr. Erasmus Wilson. In this disease there is an enlargement of the root sheath at the lower part of the hair follicle, which becomes expanded into little finger-like projections. The upper part of the sheath is also greatly hypertrophied, and presents an infundibular appearance with the base upwards. The disease shows itself externally as small, isolated, pale-red papules with flat tops, covered with fine silvery scales. Larger or smaller patches are formed by the development of fresh intermediary papules, and not by a peripheral extension of the old ones. The disease spreads till it affects a whole region or even the entire body. The appearance is then quite characteristic. The integument is harsh, dry, thickened, reddened, and covered with fine, silvery, epidermic scales, which differ, however, from those of psoriasis. The affection is very chronic and apt to recur. For many weeks or even months after the subsidence of the papules and thickening, deeply pigmented atrophied depressions may be seen on the skin. The staining is often more marked and more persistent than that of syphilitic eruptions. The most common seats of the disease are the upper limbs, especially the flexor aspects of the wrist and forearm, and the front of the legs. The patients are, as a rule, pale and out of health, and not unfrequently suffering from the effects of over-work and worry. It is stated that sometimes the disease terminates fatally.

Lichen scrofulosorum is the name given by Hebra to a disease that is rare in this country. The affection, which is most frequent in children, is characterised by the appearance of small papules of a dark red colour, occurring in crescentic or circular groups. The papules are situated at the mouths of the hair follicles and are covered with epidermic scales, which may be readily removed. The disease may show itself on any part of the body, but is most common on the back, abdomen and chest, and more rarely on the extremities, and is often associated with pustules and the ordinary manifestations of a strumous habit of the body. Although the papules frequently disappear of themselves, they are liable to recur again and again. Cicatrices generally mark the seat of the papules.

Treatment.—In the acute stages soothing applications such as gentle frictions or packings with oil must be used, and the general health must be treated according to the indications present in any individual case. Should the disease become chronic some stimulating applications will be necessary, as carbolic acid, tar, or some of the mercurial preparations. Internally, tonics or alteratives combined with some preparation of arsenic must be given for a long time.

Cod-liver oil will be necessary in the scrofulous forms.

Prurigo.—The papules met with in this disease are produced by serous exudation and cell-proliferation into and within the papillæ, and the rete Malpighii, for if the papule be punctured a drop of clear fluid escapes, or if it be squeezed the epidermis becomes tense and transparent, and a watery liquid appears. The whole of the epidermic layer is, moreover, greatly hypertrophied. The cause is not known, but the disease is rare in childhood, and is more common in men than women. The disease called *prurigo senilis*, which is really only the congestion of the papillæ and follicles of the skin produced by the irritation of scratching or of pediculi, etc., is not a true prurigo, and will, therefore, be considered when we speak of phtheiriasis. On the other hand, it must not be forgotten that the presence of any local irritant will aggravate true prurigo.

The disease is characterised by the presence of slightly elevated, broad papules which are of the colour of the skin. Many of the papules cannot be seen, but may be readily felt by passing the finger over the skin. There is always intense itching, which is made worse by anything which irritates the skin. By scratching to allay the itching, the tops of the papules are torn off and become covered with little blood crusts. When the affection has lasted a long time, the skin becomes thickened, darkly pigmented, and perhaps studded with large pustules. Sometimes there is a sensation of formication, hence the name *prurigo formicans*. When the disease is mild it is called *prurigo mitis*, and when severe *prurigo ferox*, which is said by some to be incurable. It is rarely curable in adults, but in children the prognosis is more hopeful.

The most common seats are the shoulders, neck, and the outer aspects of the arms and legs and the buttocks.

TREATMENT.—Anything that is likely to aggravate the symptoms should be avoided, and soothing applications, anodynes, and sedatives should be applied. The itching may often be allayed by an alkaline lotion containing hydrocyanic acid, or in some cases by a solution of carbolic acid (1 to 20 or 1 to 40). Applications of mild preparations of tar are often of service, and great benefit may often be derived from the use of a lotion containing about one-tenth to one-third of a grain of perchloride of mercury to an ounce. The effect will, however, be greater if some bismuth and oxide of zinc powder be combined with the mercury. Some practitioners recommend the application of sulphur with or without tar; others prefer soft soap.

Tonics, cod-liver oil, quinine, and iron will be required in the later stages. A few cases, moreover, will be benefited by a course of arsenic.

SQUAMOUS INFLAMMATIONS.

In the diseases which belong to this class the inflammation is accompanied by increased formation of epidermis. Although we include under this head pityriasis rubra and psoriasis, the two diseases are very different. In the former there is a desquamation of the infiltrated cuticle from the whole body, and in the latter an *hyperplasia of epidermis* in certain regions as a result of the increased vascularity of the hypertrophied papillary layer of the skin. The former, moreover, is a general disease accompanied by constitutional symptoms, and may eventually terminate fatally, whereas the latter is rarely attended with any symptoms referable to the general system. Both are, however, liable to recur.

Psoriasis.—The epidermic formation is considerably increased as a result of enlargement of the papillæ and their capillaries. The papillæ are themselves the seat of cell-proliferation and infiltration. The collections of epidermis vary much in size, from a minute point to extensive areas occupying many inches of surface. The favourite seats are the elbows and knees, from which the disease gradually spreads, keeping for the most part on the extensor aspect of the limbs. Next in frequency are the scalp, face and trunk, and more rarely the nails. The disease is often hereditary, but may occur in healthy persons, especially if they have become temporarily debilitated.

It would almost appear that in some instances psoriasis is strictly and literally a disease of the skin, due solely and entirely to some perverted state of the nutrition of certain areas of the cutaneous tissues, and altogether independent of the general system. This is more particularly the case in some of the hereditary forms—the disease continuing for years uninfluenced by any condition of health or by treatment. But this is not always the case, for psoriasis is very prone to be transmitted in scrofulous and gouty families, and in these instances the state of health does affect very materially the skin affection. In gouty subjects for instance, outbreaks of psoriasis may alternate with ordinary attacks of gout, and sometimes the skin disease may be made to disappear by remedies that relieve or remove the other gouty symptoms. Particular kinds of diet seem to start the disease in some persons, at all events the disease may sometimes be cured by changes in the diet. Dr. Passavant of Frankfort, and the late Dr. Parkes of Netley, whose valuable and intelligent labours have done so much to advance the art and science of medicine, have each observed chronic psoriasis to rapidly disappear when the patient was placed on a meat diet, although every other mode of treatment had previously failed.

Psoriasis is characterised by the appearance of dusky-red or coppery, slightly elevated patches, covered with white silvery scales. At first the spots are minute, as in *psoriasis punctata*, they then increase in size, and the disease is called *psoriasis guttata*; when they are still larger, *p. nummularis*, when very extensive, *p. diffusa*, and when they consist of rings, *psoriasis circinata* or *lepra*, which is merely an advanced, or, may be, healing stage of psoriasis, and from which it does not essentially differ. When adjoining rings coalesce, they cease to extend in that direction, and from the odd figures sometimes thus produced, the disease has been called *psoriasis gyrata*.

Another variety of which I have seen many examples has been termed by Dr. McCall Anderson *psoriasis rupioides*. In this form, which occurs most frequently on the chest, the scales are collected into rupioid crusts. The disease is not essentially syphilitic, although it may occur in syphilitic or strumous persons. If the crust be torn off and the lower layers examined under the microscope, they will be found to be crowded with leucocytes and abortive epidermic cells. The base from which the crust is detached is often raw and very vascular.

When psoriasis has lasted a long time, the structure of the skin becomes altered, the elements of the true skin being replaced by fibroid tissue, so that the integument is thickened and indurated, harsh, dry and fissured.

TREATMENT.—In the acute and congestive stages soothing applications, such as water dressing, oil, or alkaline baths are best. Later on, when only thickening and scaliness remain, some preparation of tar will be found useful. As regards the general treatment, the kidneys and liver should be made to act freely, and when the congestive stage has passed, tonics may be prescribed. Cod-liver oil should of course be given to strumous patients, and an occasional course of alkaline colchicum mixture may often expedite the cure in gouty subjects. In chronic cases especially where there is an excessive formation of epidermis and thickening of the skin generally, some preparation of arsenic should be given. If the subjects be anæmic, steel wine and the arsenical solution answer well, but if there be no anæmia, the arseniate of soda combined with gentian and bicarbonate of soda may be found to answer better, especially if there be a tendency to chronic gastric catarrh. But it must be borne in mind that whenever arsenic is given, it should be continued for a long time in gradually increasing doses. The fact that the arsenic produces irritation of the mucous membrane is not of itself an indication to discontinue the remedy. To ensure a cure, the drug must be continued for at least six weeks after all traces of the disease have disappeared.

Pityriasis simplex consists of a slight superficial inflammation of the skin, followed by a furfuraceous desquamation, and is generally of an eczematous nature. The scalp is the most common seat. This is altogether different from the disease which Hebra has described as pityriasis rubra, which, although not common in England, is sufficiently frequent and important to merit some consideration here.

TREATMENT.—Oily and astringent applications cure the simple form.

Pityriasis rubra of Hebra is an acute general superficial inflammation of the skin which may begin in any part, but *which extends over the whole body within a few weeks.* The cutis is intensely red, congested, and swollen, and the cuticle, which is greatly increased in quantity, flakes off in large masses. The desquamated cuticle is mixed with a certain amount of exudation matter, which is, however, never sufficient to cause more than mere moisture. The disease occurs in debilitated persons, and is very liable to recur and is, in fact, said to be ultimately fatal. The temperature is not, as a rule, elevated, but it may be, but probably only as an accidental manifestation in the course of the disease. The phenomena observed in this disease seem to point to some change in the sympathetic nervous system. When the case is progressing towards a cure, the cutis becomes less red and swollen, the desquamation diminishes, and finally the skin resumes its normal appearance. Sometimes, however, the disease becomes chronic.

TREATMENT.—The patient should be rubbed with oil and wrapped up in bandages soaked in oil to remove the scales and to keep the skin soft and supple. Internally, tonics and cod-liver oil are necessary. Arsenic is scarcely desirable, in fact a man came into University College Hospital, about three years ago, in whom an attack of pityriasis rubra came on while he was under the influence of arsenic for some small patches of psoriasis.

DIATHETIC DISEASES.

By this term we understand diseases that are dependent on certain persistent morbid dispositions of the body which modify to a greater or less extent all the nutritive processes. For the present we shall describe, very briefly, the syphilitic eruptions only.

Syphilitic skin eruptions vary according as the patient is the subject of hereditary or acquired syphilis.

Hereditary Syphilis.—The eruptions in this variety usually show themselves when the child is a month or six weeks old, but may be deferred for several months. In addition to the marasmus and other general symptoms of hereditary syphilis already described, the child becomes affected with mucous tubercles, condylomata, and fissures about the mouth and anus, while dull erythematous rashes, which may or may not become tubercular, appear about the palms and the soles, but especially on the buttocks. Sometimes bullæ and pustules accompanied by deep ulceration appear, especially on the hands and feet. So-called syphilitic pemphigus is very frequently fatal in young children. But even in boys and girls and young adults, papular, pustular, and gummatous eruptions may show themselves as a result of hereditary syphilis.

Acquired Syphilis.—The actual nature of the eruption will vary according to the stage of the disease. The first cutaneous manifestation after the initial lesion is *roseola*, which occurs chiefly on the trunk, and consists of coppery, non-elevated spots which leave behind dark stains or *maculæ* which may last for weeks. Next come the *papular syphilides*, in which there is a deposit of granulation tissue. If the patches are still larger they are called *tubercular syphilides*, which frequently assume circular, serpiginous, or crescentic forms. About the same period the hair falls out, and often the nails become affected. *Vesicular syphilides* are rare, but are sometimes seen. *Rupia* is a bullous disease, and is always syphilitic. The bulla forms like that of pemphigus, but instead of the crust falling off it remains attached, while the ulceration extends under it and forms another layer. This goes on until several layers are formed, each one being larger than that above, hence the cockle-shell shaped crusts which are said to be characteristic of this disease. If the scab be removed a grey, sloughy-looking ulcer will be exposed. It should not, however, be forgotten that the typical rupia-crust may often be seen in cases where there is not the least evidence of a primary bullous stage. Exactly the same appearance may result from the ulceration of tubercular syphilides. In fact, it may be alleged that if rupia be regarded as essentially a bullous affection, it is very rare, whereas rupia-like ulcerations, are very common in syphilis. The so-called *pustular syphilides* are usually due to the suppuration which takes place around the syphilitic deposit in the walls of the follicles in the disease known as *syphilitic acne.* The *squamous syphilides* which have been called syphilitic psoriasis, differ from true psoriasis, inasmuch as the scaling in syphilis is the result of a deposit in the true skin which disturbs the epidermic formation and really causes desquamation. It will be found, moreover, that the squamous syphilides rarely affect the seats of ordinary psoriasis. A squamous syphilide is very common on the palms and the soles, the desquamation always being preceded by a deposit of morbid tissue in the cutis. The particular seat of the syphilide will often be determined by some local irritation, the disease showing itself perhaps only on those parts of the hand or foot that are more pressed upon in work or in walking. In the later stages of syphilis, true *gummata* may be developed in and beneath the skin. These give rise to large, prominent, coppery, tubercular masses, which readily break down and ulcerate. It will, however, generally be found that the amount of true skin destroyed by this ulceration is much less than had been anticipated, the ulceration really resulting from a destruction of the gummatous matter, the true tissue being removed rather by the pressure exerted by this deposit than by actual ulceration. Syphilitic skin eruptions are rarely attended with itching when fully developed, but it is not uncommon to find severe itching when the eruption is first appearing. All the eruptions are, moreover, followed by deep, dusky-red staining, which may remain for months or even years after all sign of deposit has disappeared. By observing the general characters of the eruption and paying attention to the history, there will be no difficulty in establishing a diagnosis.

TREATMENT.—The treatment of syphilitic skin affections must, to a large extent, be the same as that for the other manifestations of syphilis, but there are some differences which should be observed. Mercury should be always given in the early stages, and it is, as a rule, better to avoid iodide of potassium or the combinations of mercury and iodide of potassium which are so frequently prescribed. Good very rarely comes of such treatment, and it is not always free from harm. The next question is as to the form of mercury. It will be found that the milder and less stable preparations of mercury are most effectual for skin diseases. Chalk and mercury powder, calomel, or blue pill in small, frequently-repeated doses will be found to act better on the skin than the perchloride of mercury, which in the writer's experience has proved of little value. Two grains of chalk and mercury powder with two or three grains of compound ipecacuanha powder two or three times a day until the gums begin to become red, will be found a safe and trustworthy means of treating all of the earlier and many of the later syphilides. To eradicate the disease or to prevent relapse, the remedy must be persevered in from six months to two years, according to circumstances. To avoid the irritation of the gastric and intestinal mucous membranes which sometimes occurs when patients have taken mercury internally for a long time, it will be well to omit the medicine for a day or two every two or three weeks, and to administer a saline purge to clear the bowels. So-called palmar psoriasis should always be treated with mercury, iodide of potassium being in the vast majority of cases quite useless even in the largest doses long continued.

It is very important in treating syphilis to combine tonics such as cod-liver oil, quinine, and iron, which will sometimes serve to dispel an eruption, or will at least greatly facilitate the action of the proper syphilitic remedies. In the later stages of syphilis more reliance may be placed on iodide of potassium, which may in fact be trusted to remove the gummatous deposits. It is well to combine ammonia and iron with the iodide of potassium. Locally, mercurial vapours, or inunctions will be found of great service. The sloughy-looking ulcers are best treated with the iodide of starch paste or iodoform, which cleanses the sores and facilitates the reparative action.

HYPERTROPHIES AND ATROPHIES.

In this class are included those diseases which are characterised by an increase or diminution in the size or in the quantity of the normal elements of the skin. This class is therefore a large one, but we shall consider only ichthyosis and its modified form xeroderma, elephantiasis arabum, keloid, and fibroma.

Ichthyosis and Xeroderma.—In these diseases the papillary layer of the skin and the epidermis are greatly hypertrophied, while the sebaceous follicles are small in size and few in number, so that the skin is not softened and lubricated by the fatty sebum. When there is a large accumulation of epidermis the disease is called *ichthyosis*, but when the skin is merely roughened without any marked collection of the epidermis it is called *xeroderma*.

The disease is characterised by a dry, roughened condition of the skin of the whole body, which is congenital, or comes on within the first or second year, and lasts throughout life. The patient is subject to eczematous eruptions in the flexures. When the skin is well protected and the weather mild, there is very little annoyance, but if the skin be irritated, as in windy, damp weather, it cracks and desquamates, and becomes very tender and inflamed.

TREATMENT.—Although the disease is, strictly speaking, incurable, much may be done to relieve the patient's distress by oiling the skin and keeping it supple. No internal remedies are of any special avail. The skin is always best when the patient's health is good.

Under the head of hypertrophies should be placed *tylosis* or the callosity that arises from pressure, as on the hands of workmen and on the feet. *Clavus* or corn, is a conical shaped hypertrophy of the cuticle, the apex of which presses on the tender and generally atrophied cutis, and *verruca*, or wart, is an hypertrophy of the papillæ, covered by a thick layer of the cuticle. But these affections come more strictly under the care of the surgeon.

Of the same nature is the disease that has been termed *Elephantiasis Arabum*, which consists of enormous hypertrophy of the elements of the skin and of the subcutaneous cellular tissue. The disease seems to be due to some interference with the processes of absorption the result of inflammation of the lymphatic or veins. Erysipelas is not unfrequently the first phenomenon in the series of pathological changes that eventuate in elephantiasis. The lymphatics are irritated by the erysipelatous poison, become inflamed and obliterated. Solid œdema and hypertrophy of the elements of the skin soon follow, and the parts become hard, brawny, rough, and discoloured, and very prone to ulcerate. In time the whole thickness of the tissues down to the bones may become involved. The disease is, however, rare in England, and is only amenable to surgical treatment.

Keloid consists of a localised hypertrophy of the fibrous tissue of the skin. The disease is *idiopathic* or *traumatic*. The *idiopathic* variety commences as a small, elevated, hardened mass, which is at first pale, but soon becomes pinkish and shining, and sends out offshoots like claws, which contract and produce great deformity. The most common seat is the sternum, but the disease is by no means confined to that part. The *traumatic* variety results from an unusually active growth of the cicatricial tissue closing a wound. It may therefore occur on any part of the skin that has been wounded, injured or ulcerated; nor need the lesion have been severe. The appearance it presents is that of a slightly elevated, hard, and red tubercle, with or without processes, extending into the surrounding tissue.

TREATMENT.—Very little can be done; but some cases have been cured by pressure. Caustics and the knife are of doubtful value, because the disease is prone to recur in the scar of the wound.

Molluscum fibrosum or *fibroma* consists of sessile or pedunculated tumours formed by the circumscribed hypertrophy of all the elements of the skin. They are of the colour of the true skin, and never contract as in keloid. When taken between the fingers the tumours have a peculiar soft feel, allowing of the inner surfaces of the two sides to glide over one another. They may occur on any part of the body except the palms and the soles, and may exist in great numbers. They do not cause any pain except when they become accidentally injured or inflamed.

TREATMENT.—Nothing short of surgical interference is of any avail.

Atrophy.—Loss of hair is one of the most important of the atrophic affections of the external integument, but this should be considered with diseases of the hair and hair-follicles. Sir James Paget has shown in his admirable lectures on Surgical Pathology that any constant pressure will cause atrophy, while intermittent pressure causes hypertrophy. In accordance with this pathological law, callosities of cuticle may occur as the result of intermittent pressure, but atrophy of the elements of the cutis will follow from the constant pressure of this hard, thick cuticle. In old age, too, the skin becomes atrophied, the fat is absorbed, the fibrous tissue becomes broken up and granular, the elastic fibres shrink or disappear, the follicles diminish in size and number, and the hairs fall out, so that the skin is thin, dry, harsh, inelastic, wrinkled and shrunken, and more or less bald.

NEW FORMATIONS.

Under this heading are included the heterogeneous neoplasmata of the skin, which are cancer, lupus, and rodent ulcer. These diseases are all chronic, and the newly-formed tissue has a constant tendency to spread, ulcerate, and ultimately to destroy life. As cancer and rodent ulcer are essentially surgical diseases, that is, always require surgical aid, we shall discuss only lupus, cases of which are more likely to come under the care of the physician.

Lupus.—This depends upon a deposit in the corium of what Virchow has termed "granulation tissue," the elements consisting of cells like those of the Malpighian layer of the skin. The granulation tissue is found in every element of the skin, the rete Malpighii, papillæ, fibrous tissue, the walls of the follicles, and in the subcutaneous cellular tissue. The shape, size, and extent of the growth has given birth to names expressive of varieties, but in all cases the nature of the disease is the same. If the neoplasm do not ulcerate it is called *lupus non-exedens*, but if ulceration occur, *lupus exedens*. There is another variety which has been called *lupus erythematodes*, in which the disease begins in the walls of the sebaceous follicles and in the adjacent tissue. The disease then spreads superficially at the periphery while it heals in the centre. The patches are studded with white or greenish points of sebum, which project from the diseased follicles, but there is never deep ulceration. When the disease subsides, it leaves a thin shining cicatrix.

Lupus is rare before the tenth and after the thirtieth year, but is often seen early in life in scrofulous persons. The most common seat is the face, especially the nose and the cheeks, but it may occur on the buttocks, extremities, and, more rarely, on the trunk. The tissues most liable to become affected are the cartilaginous and the fibrous, and the mucous membranes. The disease commences as small, softish, red, and vascular nodules, which are not at all painful. In time the nodules increase in size and extent, and become covered with white scales of detached epidermis. After remaining for a varying period of time, the growth may undergo fatty degeneration, and become absorbed, leaving a superficial or depressed scar, according to the degree of deposit—*lupus non-exedens;* or the growth may spread and become extensively and deeply ulcerated, producing unsightly deformities, and even destroying whole organs—*lupus exedens.*

TREATMENT.—General tonics and good living. Cod-liver oil is very valuable in these cases, and often serves for a cure without any local applications. If the disease have ceased to spread and there be not much vascularity, small doses of iodide of potassium are useful, and assist in the absorption of the morbid tissue. Locally, if the parts be irritated, inflamed, and swollen, soothing applications, such as oxide of zinc and liquor plumbi should be used. A very useful application is oxide of zinc and starch powder in the proportion of three drachms of the former to one ounce of the latter. Powdered French chalk may be used. These preparations are capable of taking up a large quantity of moisture, and therefore dry up and cause contraction of the swollen tissues.

Where the disease has ceased to spread, caustics may be applied to destroy the growth. For this purpose the galvanic cautery is, perhaps, the best. After this come the actual cautery, acid nitrate of mercury, and arsenical paste. If caustics be applied too early there will be great risk of spreading the disease. Whenever there is a tendency to morbid growth, irritation of the tissues by any means whatever will stimulate them, and by that means increase the deposit.

PIGMENTARY CHANGES.

We shall describe but briefly the various pigmentary changes of the skin. They are simple and not attended with pain or discomfort beyond the annoyance they sometimes give to the delicate and sensitive feelings of ladies. All these affections are dependent on an increase in the quantity of the pigment of the skin. Sometimes the coloration is congenital, as in moles, but it is far more frequently acquired from irritation of the skin, or exposure to heat and sun. There are also what may be called pathological and physiological pigmentations of the skin, the former being seen in Addison's disease and certain cachexiæ, and the latter in pregnancy or even in women suffering from uterine affections. *Chloasma uterinum* is very common on the face of women, and rarely entirely disappears, although it becomes much fainter when gestation is over.

TREATMENT.—To remove the causes will often serve to cure the disease.

The neurotic affections of the skin may be omitted as belonging to the domain of the general physician and surgeon.

PARASITIC DISEASES.

This class includes all the effects produced by the various animal and vegetable parasites that may infest the human skin. We shall, therefore, have to describe first, the *dermatozoic* affections, and secondly, the *dermatophytic.*

The *Dermatozoic.*—In these diseases some animal parasite inhabits the skin and lives thereon. In describing the effects produced, it is well to distinguish between the *essential* and the *accidental* features of the malady. For instance, scabies is sometimes described as being a disease in which papules, vesicles, and pustules occur in certain situations, whereas the essential feature of the disease is the presence of the acarus in a cuniculus.

The skin diseases due to animal parasites are:—1. *Phtheiriasis* (*a*) pediculus capitis; (*b*) pediculus corporis; (*c*) pediculus pubis. 2. *Scabies,* acarus scabiei. 3. *Morsus* pulicis, cimecis, or (*d*) *Folliculitis,* acarus folliculorum.

Phtheiriasis is the condition characterised by the presence of pediculi on the body. At least three kinds of pediculi infest the human body, the *pediculus capitis,* the *pediculus corporis,* and the *pediculus pubis,* or crab louse. It is not necessary to describe these well-known varieties.

The *pediculus capitis* inhabits the hairy scalp, and by the irritation it produces may give rise to impetigo with consequent enlargement of the glands in the neck. The *pediculus corporis* infests the trunk and clothes of persons, especially of those somewhat advanced in years. The real habitat of the pediculus corporis is the clothes, especially the seams and folds, so that the irritation of the skin will always be found worse on those parts of the body where the clothes press, as at the shoulders and the waist. The characteristic lesion is a small depressed hæmorrhagic spot, which is, however, *not* on the surface of the skin but in the mouth of the follicle. This is produced by a small quantity of blood escaping into the follicle, when the pediculus draws its proboscis out of the follicle from which it has been sucking. As a secondary result of the irritation and scratching the follicles of the skin become much congested and swollen, little papules form and the skin becomes more or less deeply pigmented; hence arises the disease known as *prurigo senilis.* The *pediculus pubis* is mostly found in the hair about the pubes, but may be met with in other parts of the trunk, and even on the limbs and eyebrows, but not, as far as is known, on the head.

TREATMENT.—Mercurial lotions or ointments applied to the skin. A clean and effectual application consists of two grains of perchloride of mercury to an ounce of dilute acetic acid, which not only destroys the pediculi but dissolves the *nits* which are formed on the hairs. The clothes must be disinfected or the disease will recur.

In order to ensure the destruction of the nits, the clothes should be heated up to at least 200° F. Many other applications such as staphisagria, sabadilla, carbolic acid, chloroform, &c., are recommended for the destruction of pediculi.

Scabies, as we have just said, is a disease due to the presence of the *acarus scabiei* under the epidermis. The female insect bores obliquely through the upper layers of the epidermis, under which she deposits her eggs. She then tunnels her way under the epidermis, forming fine semicircular furrows or cuniculi, which she fills with eggs. The male, which is distinguished from the female by being smaller and possessing suckers on the posterior pair of the hind legs, does not make these little furrows. At the point where the insect rests a little vesicle may be seen, from which the cuniculus extends. As a result of scratching and irritation, papules, vesicles, and pustules form, and the skin becomes excoriated and disfigured with large ecthymatous pustules. There is considerable itching, which is worse when the patient is warm, especially in bed. The disease is most commonly seen in the delicate skin between the fingers and toes, and extends up the limbs but chiefly on the flexor aspects. It occurs, also, on the penis, mamma, and even on the face. In babies, it is most common on the buttocks, the acarus being transferred to the part from the hands of the nurse.

TREATMENT.—Sulphur-baths or sulphur inunctions, or styrax, will soon effect a cure, but care should be taken not to keep up the treatment too long lest eczema be induced.

The *dermatophytic* diseases are those characterised by the presence of vegetable fungi in or on the epidermis. They are *Tinea tonsurans*, *Tinea circinata*, *Tinea sycosis*, *Tinea kerion*, *Tinea versicolor*, *Tinea favosa*, and, according to some authorities, *Tinea decalvans*.

Tinea tonsurans is due to the growth upon the skin of the vegetable fungus called the *tricophyton*, which consists of oval transparent spores, many of which are isolated, while others unite and constitute jointed filaments. The fungus inhabits the hairs and their sheath, and the epidermis of the scalp and other parts of the body. When the hairs are affected they swell up, become paler in colour and opaque, and lose their elasticity, breaking off close to the surface of the skin. The hair splits up and the cortical portion and even the cylinder are found full of sporules and mycelia. The effects of the fungus vary according as it occurs on the body, or on either beard or scalp.

1st. *Tinea circinata*, or ringworm on the body, commences as a small, circular, pale, elevated spot of the size of a split pea or larger, which is covered with fine scales, and is attended by great itching. As the spot increases in size the centre clears, and the patch becomes a ring, which may extend till it attains a diameter of three or four or more inches. It may occur on any part of the body, but is more common in those parts which are more freely exposed to the contact of the fungus, as the face, neck, back of hands, wrist.

2nd. *Tinea sycosis*, or ringworm of the beard, begins as *Tinea circinata*, but soon the fungus invades the hair, and the hair-follicles. The hairs break off short, and are filled with fungus, while the adjacent tissue becomes swollen and indurated. This disease is very rare in England, very few unequivocal cases having been recorded.

3rd. *Tinea tonsurans*, or ringworm of the head, is met with chiefly in children. The disease begins as little rounded patches of various sizes, from which the hairs break off, and which are covered by a furfuraceous scaliness. The patches therefore are studded with short stumps of pale hairs, which are split and frayed out.

If by any means the patch of ringworm becomes inflamed, the tissue surrounding the hair becomes swollen and granular, the hairs falls out and the follicles pour out a viscid secretion. This is what has been called *Tinea kerion.*

4th. *Tinea versicolor*, or *chloasma*, as it is sometimes incorrectly called, is the peculiar fawn-coloured furfuraceous scaliness of the skin, which is due to the presence of the fungus, known as the *Microsporon furfur*, which consist of fine curved branched filaments, and large collections of conidia.

The favourite seat of the fungus is the front of the chest, but it may extend to other parts of the body. It is especially common in phthisical persons, and is undoubtedly contagious.

5th. *Tinea favosa* is seldom seen in England, and occurs mostly in young ill nourished children. This disease is characterised by the presence of yellow cup-shaped crusts, which may be separate or united into large masses. The fungus of which the scabs are composed is the *Achorion Schönleinii.* The disease begins in the inner root sheath of the hair follicle, from which it spreads, and is usually accompanied by deep ulceration of the skin. Under the microscope the fungus consists, for the most part, of little rounded or oval bodies of about $\frac{1}{3000}$th of an inch in diameter, and of tubes branched, empty, and granular, simple and jointed.

The crusts possess a peculiar odour, which has been compared to the smell of the urine of a cat, or of a cage in which mice have been kept. Although the hairy scalp is the most frequent seat of the disease, it may occur on other parts of the body, as the face, arm, and neck.

6th. *Tinea decalvans.*—The disease commonly known by this name, but more correctly called *Alopecia areata*, has for long been regarded as a parasitic disease, due to the *Microsporon Audouini*, but the evidence of its parasitic nature is entirely wanting, the best observers having failed to find any plant. The disease consists of smooth, shining, bald patches on the scalp. The roots of the hairs are atrophied, and the hairs readily fall out. The alopecia appears to be due to a mal-nutrition of the skin of certain parts. Generally the hairs grow again. Numerous cases have been recorded to show the contagious nature of this disease, but no one has ever satisfactorily demonstrated the fungus, and it is certain that in the majority of the cases designated tinea decalvans, no fungus can be found. It is possible, however, that two diseases have been confounded, one in which fungus does exist, and another which is more common, in which the disease consists of atrophy of the root of the hairs from some want of nutrition.

TREATMENT.—To treat dermatophytic diseases, we should pluck out the diseased hairs, and clean the patches by rubbing in soft soap, and then apply some parasiticide, as equal parts of sulphurous acid and glycerin, or one part of carbolic acid to three, four, or even ten parts of glycerin. The perchloride of mercury lotion recommended for pediculi is useful. When the patches are inflamed, soothing applications are best. In *tinea decalvans* rubefacients are necessary. I prefer the application of mustard leaves or poultices, or the continuous current.

AFFECTIONS OF THE GLANDS.

We may now briefly consider the functional and structural affections of the glands of the skin. In many cases both the sebaceous and sudoriparous glands are simultaneously affected, as a result of some alteration in the relation existing between the blood and the excretory apparatus. At other times the causes are purely local.

Sweat glands.—The secretion of the sudoriparous glands may be altered in quantity and quality. Excessive sweating is called *hyperidrosis;* diminished sweating *anidrosis.* If the mouth of the follicle is closed when the sweating is in excess, the acid liquid collects and distends the follicle, and gives rise to clear, pearly vesicles, known as *sudamina*, or *milaria alba.* If the follicle be at the same time inflamed, the fluid will be less clear and alkaline, and there will be a halo of redness round the follicle; this is known as *milaria rubra.* Sometimes the colour of the sweat is altered to yellow or black, &c., but it must be confessed that the majority of these cases are probably impositions.

Sebaceous glands.—Sometimes the excretion of sebum becomes excessive, and it collects on the surface of the skin. If there be much stearin, or margarin, the sebum will collect in flakes and crusts, but if there be an excess of olein, the skin will appear greasy. Both these forms of *seborrhœa* are common on the scalp, especially in babies. The skin often becomes tender and inflamed under the cakes of sebaceous matter, and eczema is set up.

When from any cause the secretion of the glands does not escape, but remains in the ducts, a little point which soon becomes black, is seen on the surface of the skin, at the mouth of the follicle, and a *comedo* is said to exist. If this retained excretion irritate the wall and set up a slight amount of inflammatory redness, *acne punctata* is produced. But if, in addition to the redness, there is a considerable amount of inflammatory exudation and new growth forming hard masses, we have *acne indurata*, and when the points suppurate, *acne pustulosa.* When the acne nodules are accompanied by great vascularity from varicosity of the adjacent venules, and by a great increase of the surrounding connective tissue, it is called *acne rosacea.*

Acne is most common at the time of puberty, and seems to have some connexion with the development of the sexual organs, but some, and especially those outside the profession, have made too much of this, and cruelly regard those suffering from acne as the subjects of self-abuse. This is an opinion that should be warmly combated as calculated to ruin many a good name. In young adults the disease is often met with associated with dyspepsia and derangement of the organs of generation, or as a result of exposure to heat, or from want of proper cleanliness.

The favourite seats are the face, back, and shoulders, where the sebaceous glands are largest and most active.

TREATMENT.—Improve the general health; treat symptoms as they occur; evacuate the follicles by frictions or pressure, and stimulating applications. Sulphur ointment and soft soap are useful locally, and the application of a weak solution of perchloride of mercury (p. 791) is often followed by good results.

Molluscum contagiosum.—In this disease there are numerous small pedunculated or sessile tumours on the skin, varying in size from a pin's head to a large pea, or even a bean. On the summit of each may be seen the depressed aperture of the follicle, the disease being due to an enormous hypertrophy of the sebaceous glands, and not merely to retention of secretion. The contagiousness of this disease has been denied by some, but it must be allowed that in some instances there is unequivocal evidence of contagion. The writer has met with a case in which the trunk and lower extremities became covered with hundreds of these tumours, as the result of contagion from sexual intercourse with a woman who had some of these molluscuous tumours on the thigh.

TREATMENT.—When recent, the glands may be readily squeezed out bodily, and the disease thereby cured; but if growths have existed some time they require more force to bring them away, and then they often crumble under pressure. Some writers recommend the application of nitrate of silver to the wall of the gland after the contents have been evacuated, but this is rarely necessary.

Sycosis consists of an inflammation of the hair-follicles and sebaceous glands. The disease seems to commence in the follicle or in the tissue outside, and to implicate gradually the glands. There is considerable redness, swelling, and suppuration, and if the disease be neglected the glands will ulcerate out and leave a thin, shining cicatrix, on which the hairs never grow again. The causes are various. Irritation of any kind, as shaving with a dull razor, or the application of irritative washes, may produce it. The disease is remarkably obstinate, and may last for years.

TREATMENT.—The hair should be cut close and epilated early, and, if suppuration have taken place, small scarifications should be made. By epilation the disease may at once be cured, or at the least greatly checked; and it is vain to hope for any good effects so long as the hairs remain to keep up the irritation. Tonics and arsenic in some form will also be found useful in the later stages.

Xanthelasma or Vitiligoidea is due to an alteration of the epithelium lining the sebaceous follicles, accompanied by a fatty infiltration, and the deposit of a light-coloured pigment. It occurs in two forms, the *plane* and the *tuberous*, and presents itself in little yellow patches, especially about the upper eyelids, but it may be found on any part of the face, limbs, and palms. It is said never to occur in children, but a case was lately seen at University College Hospital, in which acute general xanthelasma had shown itself in a young child one year old. Frequently, but by no means always, the disease is associated with some affection of the liver.

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